Digital Cooperation Organization

AI-REAL TOOLKIT

AI READINESS TO EMPOWERMENT, ADOPTION, AND LEADERSHIP

AI ADOPTION PLAYBOOK

GUIDING NATIONS FROM READINESS TO AI ADOPTION & LEADERSHIP

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1. EXECUTIVE SUMMARY

The AI Adoption Playbook is part of the DCO AI-REAL (Readiness to Empowerment, Adoption, and Leadership) toolkit initiative, and is designed to guide countries in their journey from AI readiness to accelerated AI adoption, serving as a strategic companion for harnessing the transformative potential of AI technologies. As nations increasingly recognize the pivotal role of AI in enhancing competitiveness and innovation across various sectors, this playbook provides a structured framework that integrates key strategy and policies guidelines, sector-specific initiatives, and key insights on technology, data, education, awareness and data-driven economy. Through the deployment of the National AI Strategy Outline and the Model Policy for AI, coupled with detailed National and Sectoral Initiatives, the playbook aims to elevate national capabilities, foster economic growth, and ensure the ethical integration of AI technologies in key focus sectors including but not limited to healthcare, education, and public services.

The foundation of the playbook's framework is a deep understanding that different countries possess unique needs and strategic goals. It provides tailored tools and guidelines to ensure that AI initiatives are in sync with national priorities and equipped to tackle specific societal issues. The Initiative Prioritization Framework included in the playbook enables policymakers to strategically allocate resources and efficiently evaluate AI policies and projects, optimizing impact while reducing risks. Furthermore, this playbook integrates a wealth of global best practices and regulatory standards to assist decision-makers in managing the complexities of AI adoption, ensuring that initiatives are both innovative and ethically sound.

This AI Adoption Playbook not only guides countries through the initial phases of AI deployment but also supports the sustained growth and scaling of AI technologies, paving the way for a future where AI is a cornerstone of national development and a catalyst for innovation across all sectors.

2. INTRODUCTION

The rapid advancement of AI technologies presents unparalleled opportunities for national development and economic revitalization. Recognizing this potential, the DCO AI Adoption Playbook is designed to assist countries in leveraging AI to meet their unique development goals and overcome sector-specific challenges. It provides a comprehensive strategy outline that encompasses the development of AI policies, the enhancement of technological infrastructure, and the promotion of education and skills needed to foster a thriving AI ecosystem. Through this playbook, countries will gain insights into crafting a National AI Strategy that not only prioritizes AI adoption across key sectors but also ensures that AI implementations are strategically aligned with national interests and capabilities.

This playbook is structured to facilitate the seamless integration of AI by detailing sector-specific initiatives and providing a model policy for AI that outlines best practices in AI governance. These components are crucial in creating a conducive environment for AI technologies to flourish while addressing critical ethical, privacy, and security concerns. By implementing these carefully designed policies and initiatives, countries can enhance service delivery in public sectors, improve efficiency in agriculture and manufacturing, and drive innovations in healthcare and education. The playbook not only highlights the development of these sectors but also emphasizes the importance of building a data-driven economy that supports sustainable AI applications.

Moreover, the AI Adoption Playbook includes strategic frameworks such as the Initiative prioritization framework to aid in the decision-making process, allowing for the effective allocation of resources and prioritization of AI projects. This approach ensures that AI investments are made judiciously, with clear expectations for returns in terms of societal benefits and economic growth. This holistic approach not only accelerates AI adoption but also fosters an inclusive environment where AI benefits are widely distributed and aligned with the broader goals of national progress and prosperity.

3. AI ADOPTION FRAMEWORK

The AI adoption framework (figure 1) provides a structured approach for integrating AI across public and private sectors, driven by transformational programs based on the foundational pillars. These programs guide AI initiatives from early-stage development to full-scale implementation of sectoral initiatives focusing on efficiency, service improvement and savings.

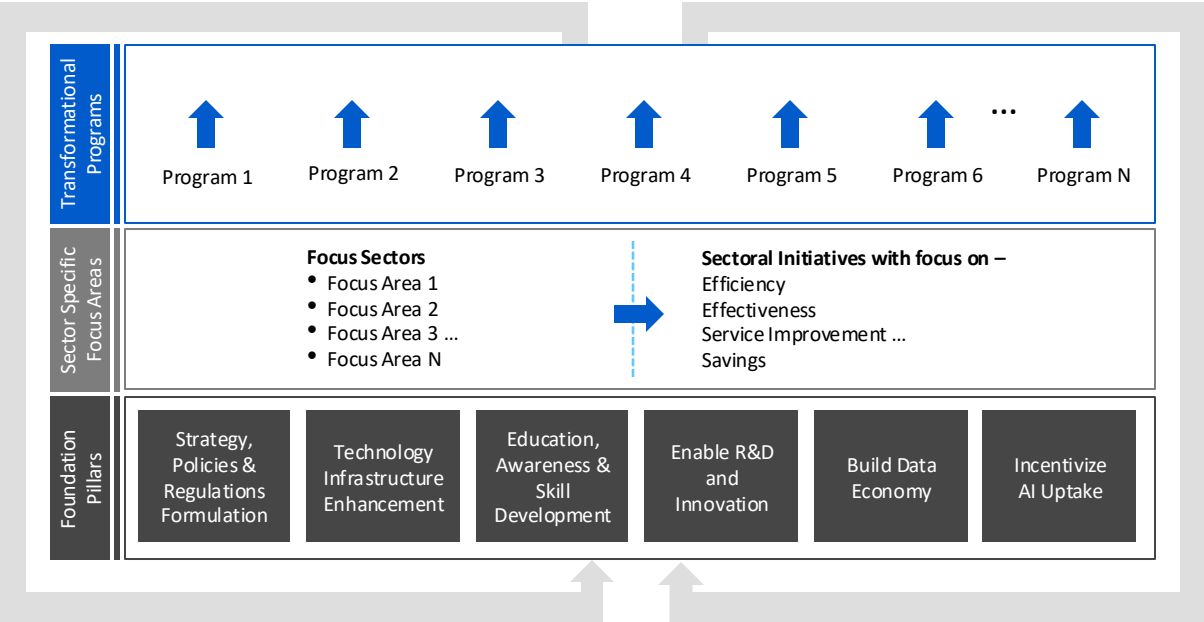


Figure 1 : AI Adoption Framework

Supporting these efforts are six foundational pillars: strategy, policy and regulation formulation, technology infrastructure enhancement, education and skill development, R&D and innovation, building a data economy, and incentivizing AI adoption derived from literature review of multiple sources. These pillars provide the essential infrastructure and ecosystem needed to ensure AI is adopted effectively and sustainably across various sectors. The framework ensures that AI is tailored to specific industry needs while also being supported by broader strategic enablers. This balanced approach allows nations, businesses, or organizations to progressively advance in their AI capabilities while addressing key sectoral challenges.

3.1 FOUNDATIONAL PILLARS

The foundational pillars in this AI adoption framework represent the essential components required to create a strong base for AI adoption and development across various sectors. The first pillar, Strategy, Policies & Regulations Formulation, focuses on setting clear strategies and developing regulatory frameworks that guide AI usage. This ensures safe, ethical, and responsible implementation, aligning with international standards. Technology Infrastructure Enhancement is critical to providing the digital infrastructure needed, such as cloud computing and advanced networks, to support AI development and implementation.

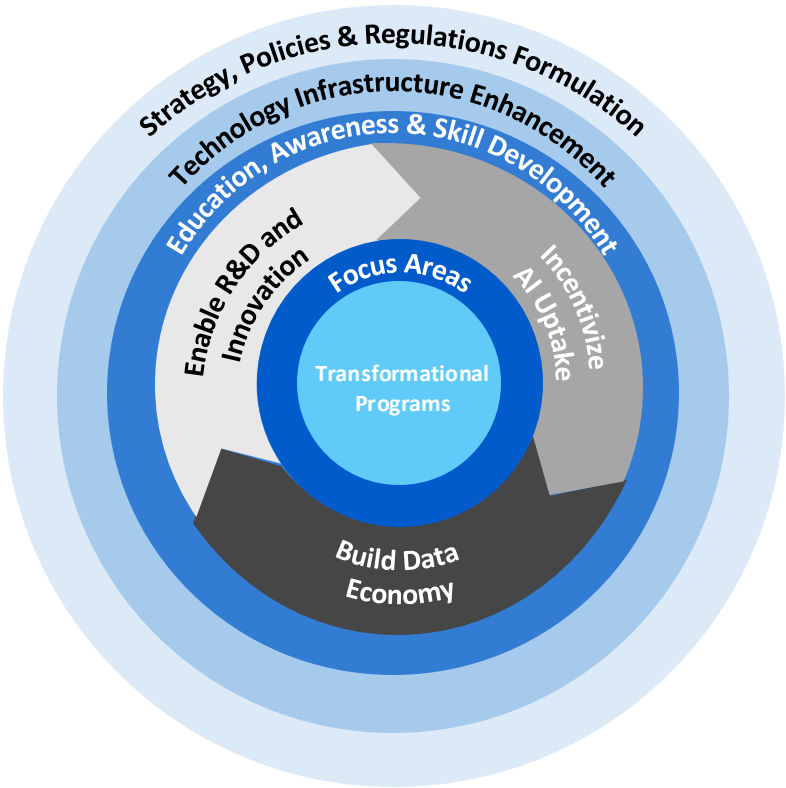


Figure 2 : Interaction between foundational pillars

Education, Awareness & Skill Development emphasizes the importance of fostering AI literacy through public awareness and formal education, ensuring a skilled workforce capable of developing and using AI technologies. Enable R&D and Innovation supports ongoing research efforts and fosters innovation by encouraging collaborations between government, academia, and private sectors, as well as creating innovation hubs to drive AI advancements. Lastly, the pillars of Building a Data Economy and Incentivizing AI Uptake highlight the importance of establishing robust data-sharing ecosystems and incentivizing AI adoption through financial and non-financial means. Creating data marketplaces and promoting data-driven decision-making are key to a successful AI-driven economy. Meanwhile, providing incentives like grants and recognition will encourage broader AI adoption across industries and sectors, supporting long-term AI growth. Transformational Programs serve as the core of the AI adoption framework, driving high-impact initiatives across sectors that aim to radically enhance AI capabilities and integration within national infrastructures.

The development of the AI assessment toolkit began with a comprehensive literature review that incorporated insights from multiple reputable sources, including as Oxford Insights, Tortoise, UNESCO, Salesforce, and the AI Readiness Benchmark by Capgemini. This extensive research phase aimed to identify the critical elements that define AI readiness and to establish a framework grounded in global best practices. By analyzing a broad array of scholarly and industry publications, the research process captured the diverse dimensions that influence a country's AI maturity. This foundational exploration of literature provided clarity on which pillars are essential for evaluating AI adoption, ensuring a holistic and robust framework for the assessment toolkit.

Moreover, the process involved benchmarking across various countries from four main regions, each representing unique geographical and cultural landscapes: the Americas (including North, Central, and South America), Europe (both Western and Eastern regions), Asia Pacific (encompassing South, East, and Southeast Asia as well as Oceania), and the Middle East and North Africa (MENA). Within these regions, specific countries were chosen based on their leadership or significant progress in the field of AI. The selection included established leaders such as the United States and the United Kingdom, innovation-driven nations like Singapore, and emerging players like Benin and the United Arab Emirates. Each of these countries has shown noteworthy advancements in AI development, making them valuable for understanding diverse approaches to AI readiness.

By examining global AI leaders across multiple regions, the analysis highlights best practices, innovative strategies, and effective policies that have proven successful in different contexts. This global benchmarking effort enables the toolkit to showcase not only advanced methodologies but also adaptable approaches that can be applied across a range of conditions and infrastructures.

The outcome of this meticulous research and benchmarking process is a set of six core pillars, each encompassing critical dimensions identified across the literature and benchmarking analyses. These pillars include Strategy, Policies & Regulations Formulation, Enable R&D and Innovation, Data Economy, Technology Infrastructure Enhancement, Incentivize AI Uptake, and Education, Awareness & Skill Development as referenced in Appendix 7 . Each of these pillars addresses specific components that are crucial for a country’s ability to adopt and scale AI effectively.

The following are the pillars that were identified:

1. **Strategy, Policies & Regulations Formulation** focuses on the establishment of a national AI vision and the regulatory frameworks needed to govern AI development responsibly. This pillar ensures that countries have a coherent strategy aligned with their broader economic and social goals, as well as clear regulations that foster innovation while addressing ethical considerations.

2. **Enable R&D and Innovation** emphasizes the importance of fostering an environment conducive to research and development in AI. This pillar includes dimensions such as innovation capacity and research output, encouraging countries to support innovative AI solutions and stay at the forefront of technological advancements.

3. **Data Economy** addresses the availability, quality, and management of data, which are foundational for AI development. This pillar includes aspects like data availability, data quality, and data management practices, ensuring that countries have the data infrastructure required for effective AI deployment.

4. **Technology Infrastructure Enhancement** is dedicated to the technological foundation required for AI, including cloud infrastructure and IT advancements. By investing in these areas, countries can create a robust environment that facilitates the deployment and scaling of AI technologies.

5. **Incentivize AI Uptake** focuses on encouraging AI adoption through investments, public-private partnerships, and entrepreneurship. This pillar aims to create a dynamic AI ecosystem where startups, investors, and international collaborations contribute to the growth of AI capabilities.

6. **Education, Awareness & Skill Development** highlights the need for a skilled workforce capable of supporting AI initiatives. This pillar covers education and continuous learning programs that equip individuals with the necessary skills to drive AI innovation, ensuring that human capital keeps pace with technological advancements.

3.1.1 Strategy, Policies & Regulations Formulation

3.1.1.1 National AI Strategy Formulation

As AI is rapidly transforming economies, societies, and industries across the globe, nations that embrace AI will unlock unprecedented opportunities for innovation, competitiveness, and societal progress. To effectively harness the power of AI, countries must develop a robust national AI strategy that prioritizes creation of required enablers to accelerate the adoption of AI across public and private sectors. National AI strategy should align with a country's long-term goals while addressing the key challenges in talent, infrastructure, investment, and regulation. It must be flexible and responsive to the rapid evolution of AI technologies and their applications.

The comprehensive framework shown in Figure 3, is based on the prescribed guidelines by world leading organisations such as World Economic Forum, highlights the essential components and factors to be considered while formulating a national AI strategy.

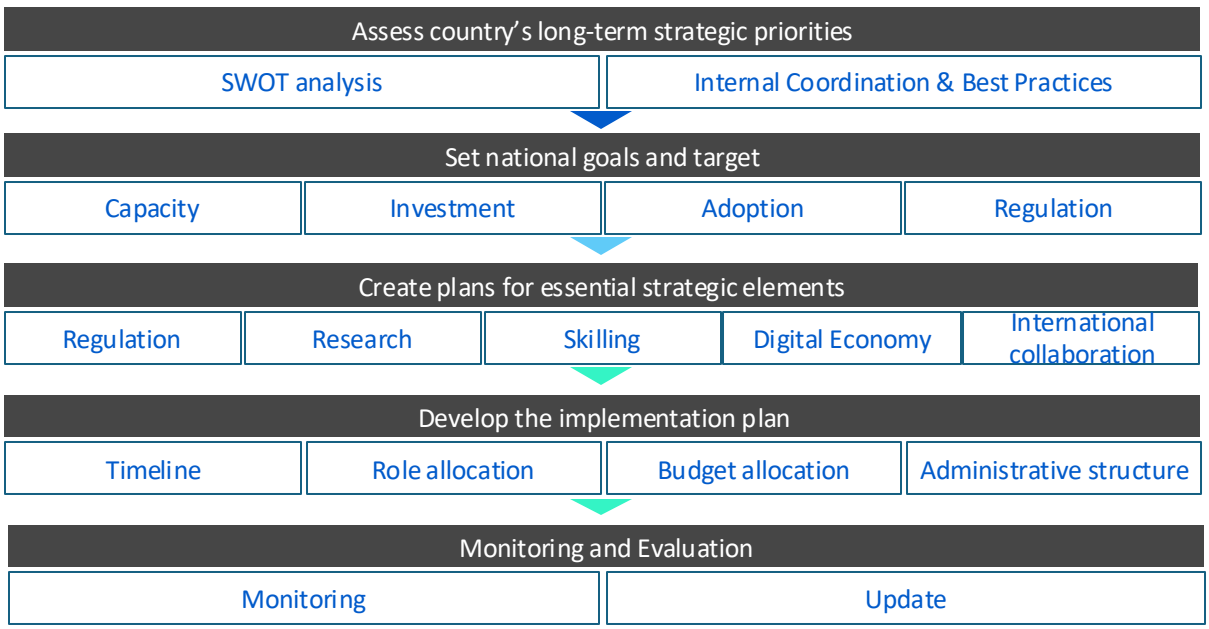


Figure 3 : National AI Strategy Framework[1]

It involves assessing the country's AI landscape analysis, setting national goals and creating targeted plans for essential elements such as AI governance, research, skilling, and international collaboration. The framework emphasizes establishing a clear implementation plan with timelines, role allocation, and budget, supported by a robust monitoring and evaluation process to track progress and ensure continuous improvement. This strategy aims to position nations as global leaders in AI-driven innovation and economic growth. Refer the National AI Strategy Development Initiative in Appendix 4.3 (page 75) for further details on the strategic framework and its implementation.

A1. SWOT Analysis

Conduct SWOT analysis to gain a clear understanding of the country's current capabilities, identify gaps and challenges, and uncover opportunities for growth and leadership in AI adoption. By assessing strengths, weaknesses, opportunities, and threats, we can address critical issues, leverage key strengths, and position the country to capitalize on AI-driven innovation in essential sectors while mitigating potential risks and challenges.

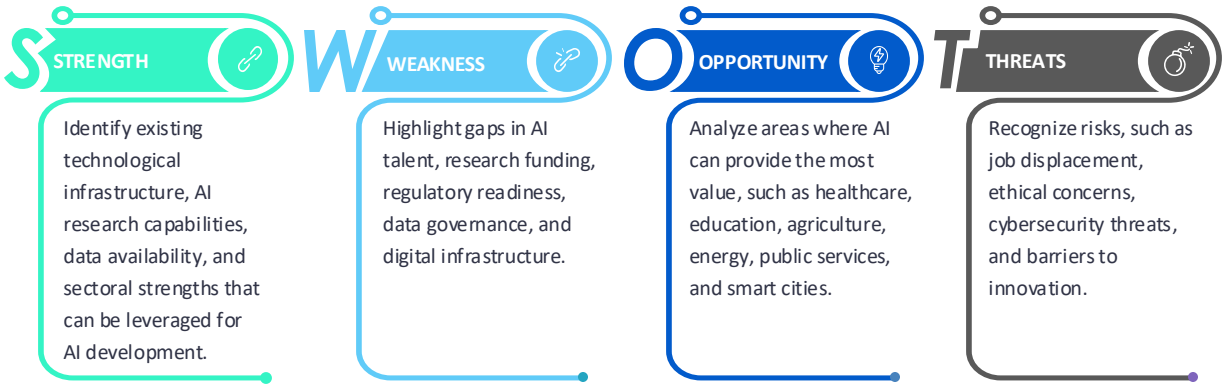


Figure 4 : SWOT Analysis Details

A2. Internal Coordination & Best Practices

Stakeholder Engagement: Consult with diverse stakeholders, including government agencies, industry leaders, academic institutions, civil society, and the public.
Sector-Specific Focus Groups: Organize consultations with sector-specific groups to assess needs, gaps, and expectations.
Global AI Landscape Study: Review international best practices, benchmarking against AI-leading nations (e.g., US, UK, Singapore).

Outcomes of SWOT analysis and pre-strategy consultation will help in establishing national AI vision that outlines the nation's long-term goals for AI, establishing an aspirational statement that reflects the desired future. It should focus on how AI will impact the economy, society, and global standing.

B. Set National Goals and Targets

A national AI strategy must be crafted to achieve a set of well-defined objectives. Based on insights from a national SWOT analysis, the objectives of the strategy should concentrate on specific goals across the following domains:
Capacity building: Enhancing human resources and strengthening digital infrastructure.
Investment goals: Fostering research & development and providing grants.
Adoption targets: Promoting AI integration across socioeconomic & industrial sectors.
Regulatory framework: Establishing supportive regulations, including privacy and ethical standards for data usage.

C. Create Plans for Essential Strategic Elements

To achieve national AI goals, nations should focus on AI regulation, innovation, skilling, and international collaboration. Establish governance, promote research and workforce development, and create a thriving digital economy through AI ecosystems and global partnerships.

Regulation

- Establish a national AI regulatory body to oversee AI systems' safety, transparency, and ethical compliance.
- Create guidelines for AI in sensitive sectors and critical infrastructure.
- Foster public trust by setting standards for fairness, bias mitigation, and privacy protection in AI technologies.

Research & Innovation

- Strengthen national AI research through public funding and academic partnerships.
- Encourage public-private partnerships to foster innovation and commercialization of AI technologies.
- Incentivize collaboration between universities, industries, and research institutions to bring AI solutions to market.

AI Skilling

- Develop a national AI curriculum for schools, universities, and technical institutions.
- Offer upskilling and reskilling programs for current workers, especially in industries susceptible to AI disruption (e.g., manufacturing, logistics).
- Promote lifelong learning programs to equip workers with AI and data literacy skills.

Digital Economy & AI Ecosystem

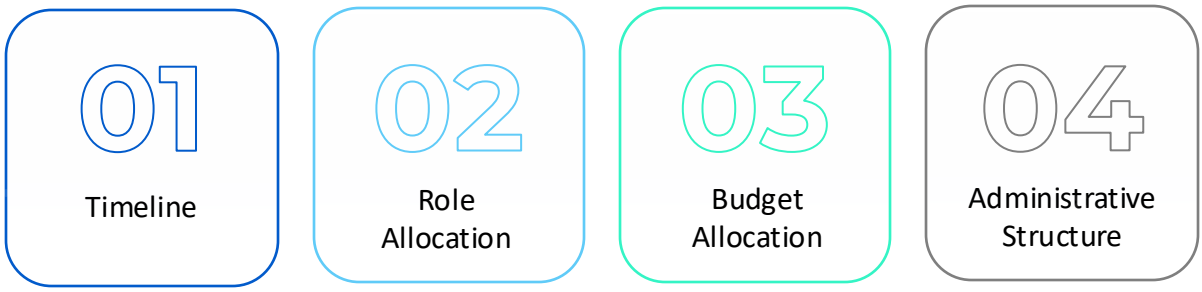
- Build a thriving AI innovation ecosystem by encouraging startups and tech hubs to develop AI solutions.
- Promote digitization of traditional industries to create demand for AI solutions.
- Foster open data initiatives, allowing businesses and researchers to access government and private sector datasets for AI model training.

International Collaboration

- Participate in global AI policy discussions and research collaborations.
- Align with international AI standards and ethics guidelines to ensure compliance in global markets.
- Develop AI talent exchange programs with leading AI nations to share knowledge and expertise.

D. Develop the Implementation Plan

To successfully transition from strategy to action, nations must design a comprehensive implementation plan that outlines specific timelines, clearly defines roles and responsibilities for stakeholders, and allocates sufficient budgets for each phase of the process. Additionally, the plan should establish an administrative framework to ensure coordinated efforts across all sectors, enabling smooth execution and accountability.



1. Timeline
- Develop a phased implementation approach (e.g., short-term: 1–3 years, medium-term: 3–5 years, long-term: 5+ years).
- Set clear milestones for regulatory changes, capacity-building programs, and AI infrastructure development.

2. Role Allocation
- Establish governance mechanisms for AI strategy implementation, assigning responsibilities to specific government agencies, private sector entities, and academic institutions.
- Form cross-sector task forces to monitor progress, ensure alignment across sectors, and adjust the strategy when needed.

3. Budget Allocation
- Allocate funds for key initiatives, including AI infrastructure, R&D programs, talent development, and regulatory bodies.
- Create funding schemes to support AI startups and SMEs in adopting AI technologies.
- Mobilize resources from public-private partnerships and international development funds to scale AI programs.

4. Administrative Structure
- Set up a central coordinating body or AI council that oversees strategy execution and fosters inter-agency collaboration.
- Develop regional AI hubs to decentralize innovation and support local industries.
- Establish a national AI observatory to monitor AI adoption, provide real-time insights, and track emerging risks.

E. Monitoring and Evaluation

The AI strategy must include mechanisms for tracking progress and refining the strategy based on outcomes.

A. Establish Key Performance Indicators (KPIs):
Define KPIs to monitor progress toward national AI goals (e.g., number of AI-driven businesses, percentage of workforce trained in AI).

B. Periodic Reviews:
Conduct annual strategy reviews to assess achievements and adjust the strategy as necessary based on evolving technological, economic, and societal trends.

C. Data-Driven Adjustments:
Implement data-driven approaches for continuous strategy improvement, using AI to gather insights on progress and make evidence-based decisions.

This National AI Strategy framework offers a comprehensive approach that can be adopted by governments aiming to leverage AI as a driver for innovation, growth, and societal progress. Through careful planning, investment, and collaboration, nations can create an environment where AI can thrive and deliver transformative benefits to their citizens, economies, and societies.

A comprehensive model national AI strategy, developed in alignment with the principles and structure outlined in this framework, has been detailed in Appendix 1. This model national AI strategy may serve as a practical guide for nations looking to accelerate their adoption of AI. It covers critical areas such as capacity building, investment, regulatory frameworks, AI adoption across sectors, and fostering international collaboration. This annexed strategy is designed to help governments effectively leverage AI to enhance economic competitiveness, innovation, and societal well-being.

More details about adoption of this initiative are mentioned in appendix 3, page 75 and Model National AI Strategy outline is present in appendix 1, page 61

3.1.1.2 AI Policy Formulation

It is important to have a legal framework dedicated to artificial intelligence, designed to address the risks associated with AI. It sets out clear requirements and obligations for AI developers and users, particularly for specific applications, while also reducing administrative and financial burdens for businesses.

As part of a broader policy initiative to promote trustworthy AI, the AI regulations are accompanied by the AI policies. Together, these ensure the safety and protection of fundamental rights for individuals and businesses while encouraging investment, innovation, and the adoption of AI across the nation.

The AI regulations and policies aims to build trust in AI technologies. While many AI systems pose little to no risk and can contribute to addressing societal challenges, some carry risks that must be managed to prevent harmful consequences. For instance, it can be challenging to understand why an AI system made a certain decision, which could lead to unfair outcomes, such as in hiring processes or public benefit applications.

Existing regulations and policies may offer some level of protection, but they do not fully address the unique challenges posed by AI. Such regulation and policies fills the gap by:

- Addressing risks created by AI applications
- Prohibiting AI practices deemed to pose unacceptable risks
- Setting clear requirements for AI systems in high-risk areas
- Defining obligations for providers and users of high-risk AI systems
- Requiring conformity assessments before AI systems are placed on the market
- Implementing enforcement mechanisms for AI systems after they are in use
- Creating a governance structure at both national and regional levels

It is essential to recognize that the development of AI regulations and policies spans several key areas, including public governance, social welfare, innovation, investment, economic impact, education, corporate governance etc. To gather insights and inspiration, countries can explore the OECD portal [2], where they can access AI-related policies published by various nations worldwide, offering a valuable resource for comparative analysis and informed policymaking.

In general, when developing AI regulations and policies, a nation should consider incorporating key principles as a foundational approach to guide the ethical use of AI. These principles, inspired by the best practices, especially by EU AI Act [3], provide a robust framework for responsible AI governance. While they can be tailored to address specific national priorities and needs, it is important to maintain global alignment with established best practices to ensure consistency and trust in AI systems across borders.

1. Risk-Based Classification

Categorize AI applications by their risk levels, ensuring that high-risk systems (e.g., healthcare, law enforcement) undergo stricter oversight, while minimal-risk systems enjoy lighter regulatory approaches, encouraging innovation. A risk-based framework categorizes AI applications based on their potential harm to the society. Nations should establish regulations that apply more stringent oversight to high-risk AI, such as systems used in healthcare, law enforcement, or infrastructure, while providing a lighter regulatory touch for minimal-risk applications like AI-powered customer service bots.

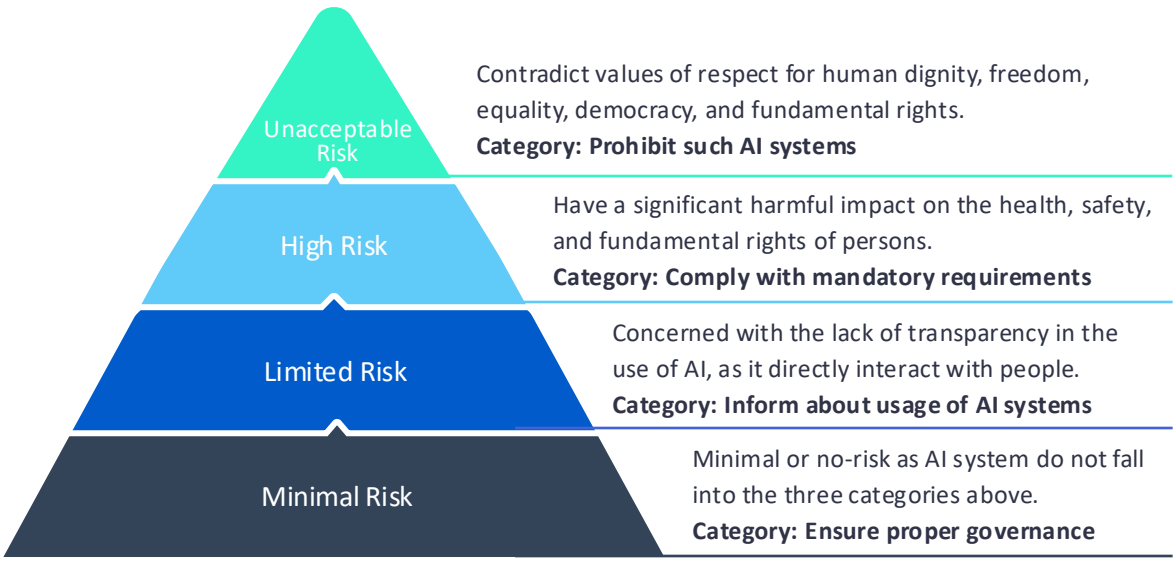


Figure 5 : Risk-based classification of AI systems

A. Unacceptable Risk

AI systems that directly contradict the core values of the nation, including human dignity, freedom, equality, and fundamental rights. These systems must be outright prohibited as they pose a severe threat to individuals or groups by manipulating behaviors or exploiting vulnerabilities. Examples of Unacceptable Risk AI Systems:

- Manipulate/persuade individuals to make decisions they would not normally choose.
- Exploit vulnerable groups, such as children, the elderly, or people in disadvantaged social or economic situations.
- AI that uses biometric data (e.g., facial recognition, fingerprints) to deduce sensitive characteristics such as political opinions, or religion.
- Real-time remote biometric identification systems in public spaces for law enforcement purposes (with some exceptions).
- Social scoring systems that assess individuals based on their behavior.

B. High Risk

AI systems that have a significant potential to harm health, safety, or fundamental rights. These systems could not be banned but must meet a strict set of regulatory requirements to mitigate risks and protect users. Nations may adapt the list of high-risk systems as technology evolves. Examples of High-Risk AI Systems:

- Systems like biometric identification and emotion recognition.
- Road traffic, water supply, gas, electricity, and other essential services.
- Assessing performance in education and vocational training, or in hiring, recruitment, and promotion, especially where they impact working conditions.
- Access to critical services like health and life insurance or credit scoring.

C. Limited Risk

Present risks related to transparency rather than direct harm. The systems that interact with individuals, and transparency is key to ensuring people know they are engaging with AI. Examples of limited risk system includes chatbots and AI-generated deepfakes.

D. Minimal or No Risk

AI systems that do not fall into the previous risk categories and, therefore, are not subject to specific obligations. These systems are generally seen as posing low or no harm, such as AI-powered video games or spam filters.

Such AI systems must still be governed properly, as the nature of AI is dynamic and may evolve over time, increasing their risk potential.

Implementing such categorization, will allow for a targeted and proportionate regulatory approach that focuses resources on the areas where AI poses the most significant risks. This ensures that risky AI systems are subjected to rigorous safety, transparency, and accountability standards, while less risky systems can be developed with fewer regulatory burdens, encouraging innovation.

2. Prohibit Unacceptable AI Uses

Certain AI applications should be banned outright, such as systems that exploit vulnerable populations or enable mass surveillance. These prohibitions align with ethical principles to protect citizens from potential harm caused by AI.

Nations adopting this framework must clearly define and legislate which AI uses are unacceptable, based on cultural, ethical, and legal standards. By doing so, they safeguard against technologies that could undermine human rights or create dangerous power imbalances.

3. Establish Clear Requirements for High-Risk AI

High-risk AI systems should meet stringent requirements around accuracy, transparency, robustness, and ethical use. Nations can create legal frameworks that require regular audits and conformity assessments for these systems to ensure their continued compliance.

In practice, this means that AI systems influencing critical decisions, such as in finance or employment, should undergo third-party testing and certification to ensure they do not exhibit bias or errors. This ensures AI operates within acceptable societal norms and aligns with human rights protections.

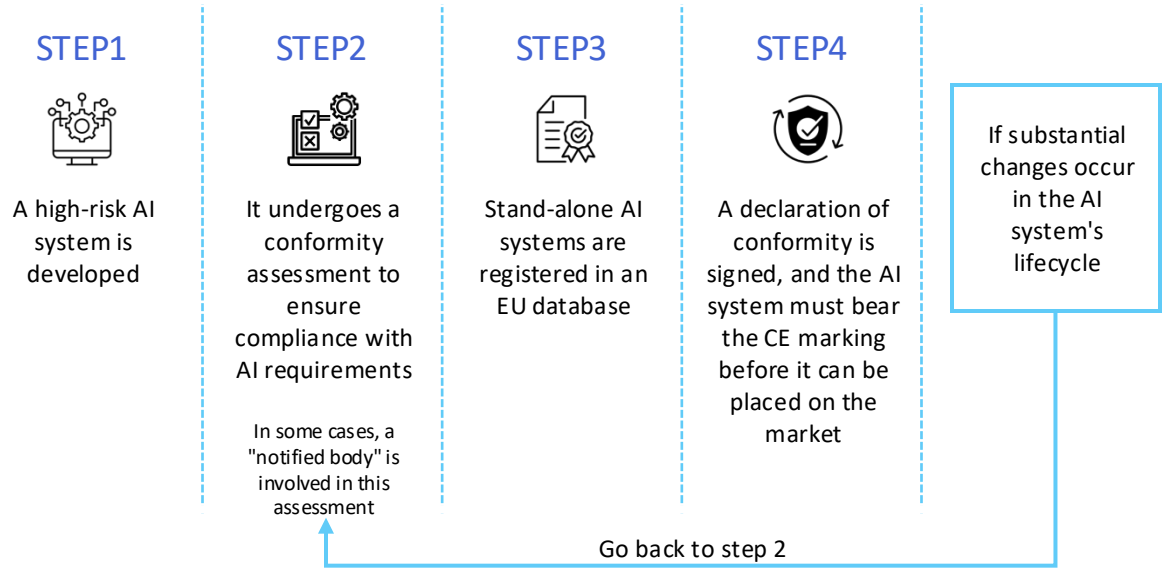


Figure 6 : Regulation of high-risk AI systems

The figure 6 illustrates the regulatory process for high-risk AI systems, likely under the EU AI Act. It starts with the development of a high-risk AI system, which then undergoes a conformity assessment to ensure it meets specific safety and ethical standards. After passing this assessment, stand-alone AI systems must be registered in an EU database for transparency and monitoring.

A declaration of conformity is signed, and the system is awarded a CE marking, indicating it complies with EU regulations and can now be placed on the market. If the AI system undergoes substantial changes during its lifecycle, it must return to the conformity assessment process to ensure continued compliance. This approach ensures that high-risk AI systems remain safe, accountable, and transparent throughout their lifecycle.

4. Establish a National AI Governance and Regulatory Body

Nations should create a dedicated body or authority to oversee AI governance, responsible for setting AI policies, conducting risk assessments, and ensuring compliance across sectors. This entity would also engage with international organizations to harmonize standards.

A centralized governance body ensures consistency in AI regulation and provides clear points of accountability. It also facilitates cross-sector collaboration and ensures that the national AI strategy aligns with both domestic priorities and international best practices.

For example, the European AI Office [4] was established in February 2024 within the European Commission, to oversee the AI Act's enforcement and implementation with the member states. It aims to create an environment where AI technologies respect human dignity, rights, and trust. It also fosters collaboration, innovation, and research in AI among various stakeholders. Moreover, it engages in international dialogue and cooperation on AI issues, acknowledging the need for global alignment on AI governance. Through these efforts, the European AI Office strives to position Europe as a leader in the ethical and sustainable development of AI technologies.

5. Foster Innovation Through Regulatory Sandboxes

Creating regulatory sandboxes allows governments to encourage innovation while ensuring AI systems are developed responsibly. These sandboxes offer AI developers a controlled environment to test new technologies while staying within regulatory guidelines.

By implementing this approach, nations can support startups and innovators in building AI technologies that align with societal needs. Regulatory oversight within sandboxes ensures that innovations are safe, effective, and scalable, while still providing room for experimentation and growth.

6. Transparency and Public Engagement

Transparency in AI deployment is crucial. Nations should require AI systems to be explainable, particularly in high-risk sectors. Citizens should be informed when they interact with AI systems, and clear explanations of AI decision-making should be provided.

This transparency helps build public trust and ensures that citizens understand how AI systems affect them. Governments should also engage the public in policy discussions, gathering feedback and making adjustments as societal expectations evolve.

7. Regular Audits and Updates

Nations should establish a framework for continuous monitoring and auditing of AI systems, particularly high-risk systems. Regular reviews will ensure that AI models remain compliant with regulatory standards and are updated as technologies and societal norms evolve.

This proactive approach ensures that AI systems maintain their integrity and effectiveness over time, reducing risks of outdated models introducing bias or errors. By building this flexibility into the regulatory framework, nations can stay ahead of the curve in AI governance.

8. Liability and Accountability

Nation must implement a clear legal framework for addressing liability in cases where AI systems cause harm. These frameworks should determine who is responsible—whether it's developers, operators, or owners—ensuring victims of AI-related harm can seek redress.

This ensures that there is accountability in AI deployment, with a clear understanding of legal responsibilities. It also encourages developers and operators to maintain high standards of safety and ethics to avoid potential legal consequences.

These guidelines may allow nations to build a robust and adaptable AI policies that fosters innovation while ensuring ethical, transparent, and accountable AI systems. This model supports economic growth through AI while protecting citizens from potential risks, aligning with global standards for responsible AI deployment.

More details about adoption of this initiative are mentioned in Appendix 3, Page 76 Model Gen AI Policy Document is mentioned in appendix 2, page 65

3.1.1.3 AI Governance Framework Development

3.1.1.3.1. AI Governance Framework

AI systems and processes face ethical challenges like bias, discrimination, and lack of transparency, where decisions may be unfair or unclear. Ensuring fairness, accountability, and explainability is key to building trust. Legally, AI must comply with data privacy laws, intellectual property rights, and evolving liability concerns, especially with AI-generated outputs. Operationally, AI systems need to be transparent, scalable, and capable of integrating with existing systems while managing risks like cybersecurity. Continuous maintenance and high-quality data are essential for sustainable AI deployment.

According to best practices, the proposed model AI governance framework serves as a foundational guide for nations to address AI's ethical, legal, and operational challenges. It emphasizes transparency, fairness, accountability, and trust by ensuring that AI decisions are explainable. Nations can use the framework to develop AI policies, regulate technologies, and ensure data privacy compliance. As highlighted in Figure 7, the framework promotes responsible AI use by focusing on key areas such as:

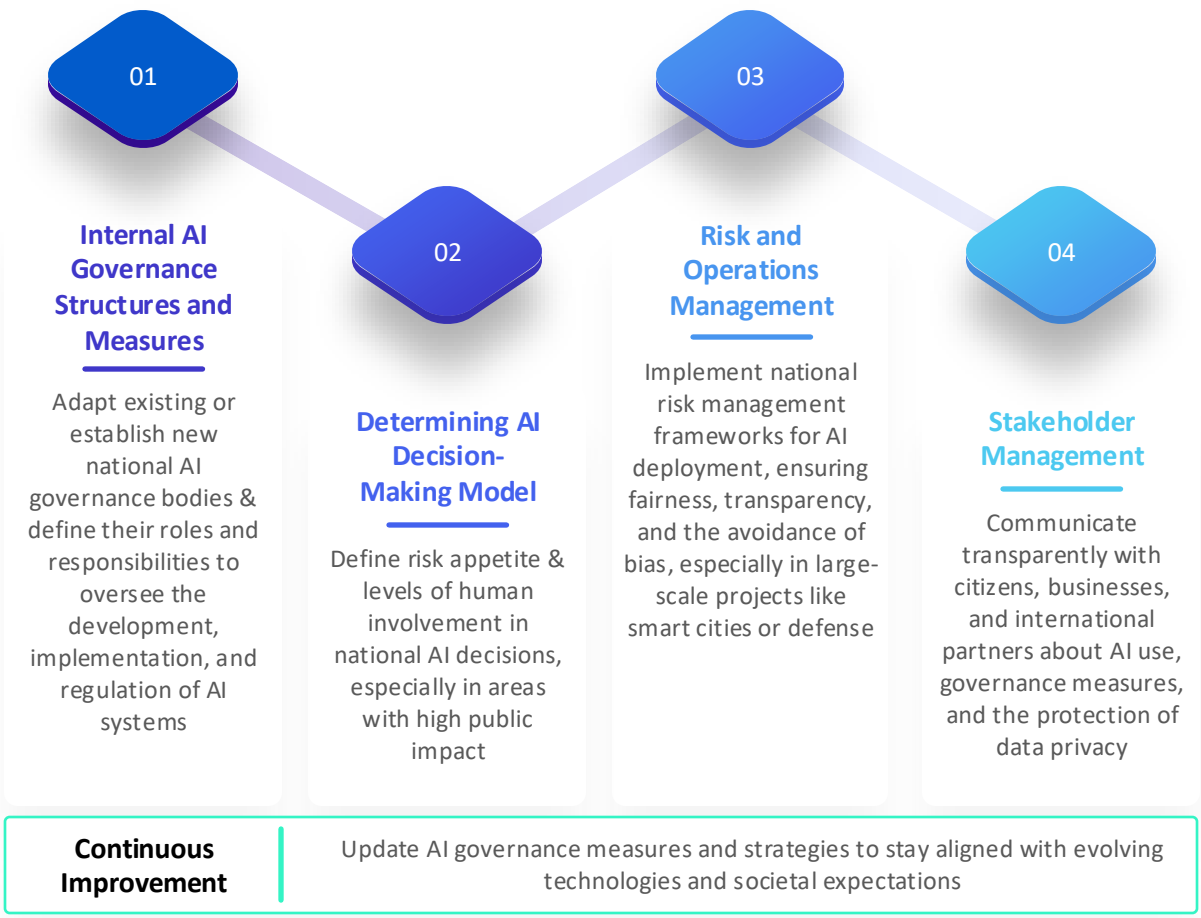


Figure 7 : Model AI Governance Framework Key Areas

1

Internal AI Governance Structures and Measures

Establish national AI governance bodies and define their roles and responsibilities to oversee the development, implementation, and regulation of AI systems across sectors

A. Clear Roles and Responsibilities

Action: Establish dedicated government bodies or agencies (e.g., a National AI Ethics Board) responsible for overseeing AI deployment, ensuring cross-agency coordination, and embedding AI governance across ministries like health, defense, and justice.

Rationale: Centralizes accountability and ensures AI governance aligns with national values, security, and legal standards.

B. Risk Management Framework

Action: Implement a comprehensive risk management framework at the national level to address potential ethical, security, and societal risks posed by AI, covering areas like autonomous systems, defense, public welfare, and critical infrastructure.

Rationale: Ensures AI systems align with national priorities and minimizes risks that could have broad societal or security impacts.

C. Training of Government Personnel

Action: Develop training programs for public sector employees to enhance their understanding of AI technologies, ethical implications, and governance practices. This includes AI ethics education for public administrators, policy-makers, and regulatory bodies.

Rationale: Ensures key decision-makers understand AI's risks and benefits, facilitating responsible deployment across sectors such as law enforcement, healthcare, and public administration.

D. Monitoring, Documentation, and Review

Action: Establish national mechanisms for continuous monitoring and auditing of AI systems. Ensure regular reviews of AI performance, decision-making processes, and documentation to maintain accountability and transparency.

Rationale: Enables the government to adjust and improve AI systems based on real-time data and public feedback, ensuring transparency and public trust.

E. Top Leadership Involvement

Action: Engage senior government officials and national leaders in AI strategy development and oversight, ensuring alignment with national priorities. This includes ministries and national-level bodies actively contributing to AI policy-making and regulation.

Rationale: High-level involvement ensures national AI initiatives are aligned with overarching governmental goals and societal welfare, making AI a part of the national strategic vision.

F. Feedback Mechanisms

Action: Create formal channels for citizens, businesses, and civil society to provide feedback on national AI policies, applications, and services. This could involve public consultations, open forums, and dedicated AI governance websites or platforms.

Rationale: Enhances transparency and public trust, allowing citizens and businesses to voice concerns, report issues, and influence AI governance in a participatory manner.

It is important to ensure that nations govern AI with ethical oversight, strategic alignment, and public engagement, fostering responsible AI development while addressing national priorities.

2 Determining AI Decision-Making Model

Define risk appetite for use of AI and levels of human involvement in national AI decisions, especially in areas with high public impact (e.g., healthcare, law enforcement)

A. Clarity on Objectives of AI Use

Action: Define the national objectives behind using AI in key sectors (e.g., public safety, healthcare, or defense) before determining the level of human oversight required. Understand the role AI plays in achieving consistency, efficiency, or innovation.

Rationale: Ensures human oversight is proportional to the risks and societal impact of AI use, aligning with national strategic goals.

B. Establishing Levels of Human Involvement

Action: Determine the appropriate level of human involvement (e.g., human-in-the-loop, human-out-of-the-loop, human-over-the-loop) based on the risks associated with AI decisions in high-impact sectors.

Rationale: Balances the benefits of automation with the need for human control in critical decisions, ensuring ethical use of AI.

C. Developing Risk Assessment Protocols

Action: Implement national AI risk assessment frameworks to evaluate the societal, legal, and ethical risks of AI applications, particularly in areas affecting citizens' rights and safety.

Rationale: Ensures AI deployment minimizes harm and promotes societal well-being by integrating human judgment where necessary.

D. Human-Centric AI Design

Action: Encourage AI systems to be designed with fairness, explainability, and human oversight to ensure AI decisions are consistent with national values and ethics.

Rationale: Protects against biased or unjust decisions by ensuring AI reflects human values and ethical standards.

E. Regular Audits and Adjustments

Action: Establish national-level periodic audits and reviews of AI systems to assess their performance, the adequacy of human involvement, and alignment with evolving societal norms.

Rationale: Allows for continuous improvement and adaptation of AI governance as technologies and societal needs evolve.

F. Public Engagement in AI Decision-Making

Action: Engage citizens through public consultations and open forums on how much human oversight should be included in national AI use, ensuring transparency.

Rationale: Fosters trust by involving the public in decisions about AI governance, especially in high-stakes applications affecting national welfare.

To summaries, it is critical to ensure responsible national AI deployment with appropriate human oversight aligned to both ethical standards and national interests.

3	
Risk and Operations Management	Implement national risk management frameworks for AI deployment, ensuring fairness, transparency, and the avoidance of bias, especially in large-scale projects

A. Data Management and Quality Control

Action: Nations must establish a robust national data governance framework to ensure that data used in AI applications is accurate, unbiased, and of high quality. The framework should mandate standards for data sharing and processing between public and private sectors.

Rationale: Ensures that AI models built on these datasets are reliable and produce equitable results. Effective data management reduces the risks of biased or erroneous decisions across large-scale national projects (e.g., smart cities, healthcare).

B. Algorithm Transparency and Accountability

Action: Promote the use of explainable AI algorithms for national public sector applications, ensuring transparency in decision-making and allowing national regulators to audit and understand how AI decisions are made.

Rationale: Ensures that the government is accountable for the AI systems it employs, building public trust and ensuring that AI decisions can be understood, reviewed, and justified by human overseers.

C. Model Monitoring and Continuous Evaluation

Action: Implement continuous national-level monitoring mechanisms for AI systems, ensuring that performance is evaluated consistently, and updates are made to accommodate new data or societal expectations. It is essential to monitor and assess models according to principles such as explainability, repeatability, robustness, traceability, reproducibility, and auditability. Testing AI solutions against these principles is critical to ensure the outcomes align with national priorities and can be clearly explained to stakeholders when necessary.

Rationale: This ensures that AI models used in government operations remain up to date, effective, and aligned with national priorities.

D. National Security and Robustness

Action: Conduct rigorous stress tests and adversarial testing of AI systems used in critical national infrastructure (e.g., defense, energy, public safety) to ensure robustness and resilience against cyberattacks and other threats.

Rationale: Safeguards national security by ensuring that AI systems can withstand malicious inputs or potential disruptions, especially in high-stakes environments.

E. Regular Updates and Audits

Action: Establish a national policy for the periodic audit of AI models to ensure compliance with ethical standards, evolving societal norms, and legal requirements. Continuous evaluation of AI systems will help mitigate risks and enhance performance.

Rationale: Periodic audits allow nations to ensure that AI systems are functioning correctly and ethically over time, while also adapting to new data, regulations, or risks.

F. Collaboration with International Bodies and Stakeholders

Action: Engage with international AI governance organizations, industry experts, and academic institutions to collaborate on AI best practices and standards. This should include both public and private sectors to standardize operational management.

Rationale: Enhances a nation's AI capabilities by learning from international best practices and adopting global standards for responsible AI deployment.

4

Stakeholder Management

Communicate transparently with citizens, businesses, and international partners about AI use, governance measures, and the protection of data privacy

A. Identifying Stakeholders

Action: Governments should clearly identify all relevant stakeholders, including citizens, businesses, government bodies, and international organizations. The level and nature of engagement with each group will differ depending on their interests and influence.

Rationale: Different groups have different information needs and concerns about AI. By identifying these groups, governments can tailor their communication strategies to address specific stakeholder expectations and build trust.

B. Purpose-Driven Engagement:

Action: Define the purpose of each stakeholder interaction. Governments must engage differently depending on whether the goal is to inform the public about AI initiatives, involve businesses in public-private AI partnerships, or communicate regulatory policies.

Rationale: Ensures that stakeholder engagement is effective, targeted, and aligned with the overall national AI strategy. The purpose behind each interaction should guide the level of detail and transparency needed.

C. Transparent Communication

Action: Ensure transparency in AI decision-making by providing clear and understandable information to stakeholders about how AI is used in government services or regulations. This includes communicating the risks, benefits, and safeguards associated with AI.

Rationale: Transparency helps to build public trust in government AI initiatives. It allows stakeholders to understand how AI decisions affect them and gives them confidence that the government is using AI responsibly.

D. Providing Feedback Mechanisms

Action: Establish channels for receiving and incorporating feedback from stakeholders on national AI strategies, regulations, or systems. This could include public consultations, surveys, or stakeholder committees.

Rationale: Engaging stakeholders in a two-way dialogue ensures that the government can address concerns and continuously improve AI policies based on real-world experiences and feedback.

E. Tailoring Information for Different Stakeholders:

Action: Customize the type of information shared based on the stakeholder group. For example, the level of technical detail may vary for regulators, businesses, or the public. Information could range from how AI models work to privacy safeguards for personal data.

Rationale: Tailoring information ensures that stakeholders understand the relevance of AI in their context and are more likely to engage productively.

5	
Continuous Improvement	Communicate transparently with citizens, businesses, and international partners about AI use, governance measures, and the protection of data privacy

Action: Governments should continuously assess and update their internal AI governance structures and measures, AI decision-making models, risk and operations management, and stakeholder engagement strategies in response to the evolving AI landscape and changing societal expectations. Regular testing and evaluation of these strategies will enhance future interactions and governance effectiveness.

Rationale: As AI technologies evolve, maintaining an adaptive and transparent governance framework ensures that governments stay aligned with the dynamic needs and expectations of stakeholders, fostering trust and accountability over time.

This framework provides a strong foundation for nations to initiate AI governance, enabling tailored and ethical AI deployment that fosters public trust and minimizes risks like bias. By adopting this approach, nations can enhance risk management, regulatory compliance, and stakeholder engagement, positioning themselves as global leaders in responsible AI while prioritizing citizen welfare through policies and regular updates.

Refer the National Responsible AI Framework Establishment Initiative in appendix 4.3 (page 77) for further details on the strategic framework and its implementation.

3.1.1.3.2. Model AI Governance Framework for Generative AI

This section outlines the Model AI Governance Framework for Generative AI, drawing from best practices and insights from leading AI governance experts. Built upon the Model AI Governance Framework, as mentioned in the previous section of this document, it addresses the emerging concerns surrounding the development, deployment, and societal impact of generative AI systems. It was created in response to the transformative yet potentially risky nature of technologies like large language models (LLMs).

The framework can particularly be beneficial for entities, including startups, working in the dynamic generative AI space, providing them with governance guidelines to navigate the complex challenges of this evolving domain.

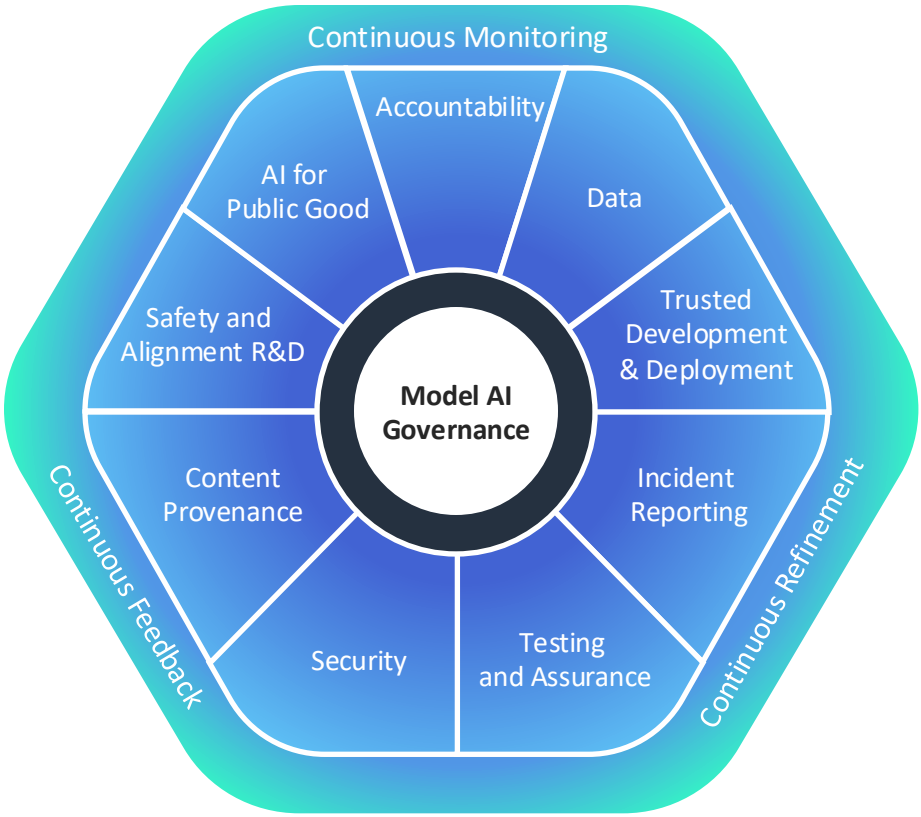


Figure 8 : Model AI Governance Framework for Generative AI

With the rise of Generative AI, which differs from traditional AI in that it can generate new text, images, or other media, new risks and challenges emerged. These models have proven highly powerful but also prone to problems like hallucinations (incorrect but confident outputs), copyright infringement, bias, and misinformation. It also introduces risks that necessitate new governance mechanisms.

The framework can address new risks posed by generative AI that were not fully covered by earlier AI governance efforts. These risks include ethical concerns about data use, the potential misuse of AI-generated content, and the lack of transparency around the inner workings of generative models. It calls for a multi-stakeholder approach, involving policymakers, industry, researchers, and the public, to create an AI ecosystem that encourages innovation while also protecting societal interests.

The Model AI Governance Framework for Generative AI seeks to provide a systematic and balanced approach to address these new generative AI concerns while continuing to support AI-driven innovation. It covers nine key dimensions: Accountability, Data, Trusted Development and Deployment, Incident Reporting, Testing and Assurance, Security, Content Provenance, Safety and Alignment R&D, and AI for Public Good. This is supported by ongoing monitoring, feedback, and refinement across all nine key dimensions.

1. Accountability

Accountability is crucial in ensuring that all stakeholders involved in the AI system lifecycle—from developers to end-users—are responsible for the ethical development, deployment, and use of AI technologies.

Key Considerations:

- Establishing clear responsibility across the layers of the AI technology stack (e.g., model developers, application deployers, cloud service providers).
- Drawing parallels with cloud services' shared responsibility models to define and allocate roles within the AI ecosystem.
- Incorporating both ex-ante (before incidents occur) and ex-post (after incidents) mechanisms to ensure that responsibilities are clear upfront and redress systems are available if something goes wrong.

2. Data

Data is fundamental to AI development, and ensuring its quality is critical for the success and trustworthiness of AI models.

Key Considerations:

- Addressing the use of potentially contentious data (e.g., personal or copyrighted data) with clarity around consent and compliance with legal frameworks.
- Encouraging businesses to adopt best practices for data governance, including ensuring data quality, fairness, and representativeness.
- Mitigating risks such as data poisoning, where malicious actors introduce false data to corrupt the model.
- Exploring the use of Privacy Enhancing Technologies (PETs) to enable AI model development while protecting privacy and data confidentiality.

3. Trusted Development and Deployment

To build trust in AI systems, there must be transparency around the safety and hygiene measures adopted during AI model development and deployment.

Key Considerations:

- Promoting best practices such as Reinforcement Learning from Human Feedback (RLHF) to align AI models with human values and preferences.
- Implementing safety measures like input/output filters to minimize harmful outputs.
- Encouraging transparency through "food label" style disclosures that provide stakeholders with key information about AI models, including data used, evaluation results, and safety measures.

4. Incident Reporting

Despite robust safeguards, no AI system is foolproof. Incident reporting structures are vital for timely remediation and continuous improvement.

Key Considerations:

- Setting up processes for vulnerability reporting and proactive security measures, like bug bounty programs in traditional software.
- Defining clear thresholds for AI incident reporting, where severe incidents (e.g., those involving public safety or fundamental rights) are escalated to relevant authorities.
- Drawing from existing practices in other domains, such as telecommunications and cybersecurity, for reporting AI-related issues.

5. Testing and Assurance

Independent, third-party testing and assurance are essential to validate the safety and performance of AI systems and to foster trust.

Key Considerations:

- Standardizing testing methodologies to ensure consistent and comparable evaluations across AI models.
- Encouraging the development of third-party testing ecosystems that can offer external audits of AI systems, ensuring they meet predefined benchmarks for robustness, fairness, and transparency.
- Eventually codifying AI testing practices into international standards through organizations like ISO or IEEE to ensure uniformity in testing across sectors and geographies.

6. Security

Generative AI introduces new security risks, especially in terms of model tampering and misuse, which go beyond traditional software security concerns.

Key Considerations:

- Security-by-design: Incorporating security features at every phase of the AI development lifecycle, from model training to deployment.
- Developing novel safeguards, such as input moderation tools and digital forensics tools specifically tailored to detect threats within AI-generated content.
- Leveraging existing cybersecurity frameworks and adapting them to address the unique threat vectors introduced by generative AI models, including adversarial attacks and data manipulation.

7. Content Provenance

With the rise of AI-generated content, it's becoming increasingly difficult to distinguish between real and synthetic media, which can lead to misinformation and other societal harms.

Key Considerations:

- Implementing digital watermarking and cryptographic provenance technologies to label and track the origin of AI-generated content, so users can verify its authenticity.
- Encouraging collaboration between content creators, platforms, and governments to ensure these provenance technologies are widely adopted and enforced.
- Educating the public about content provenance tools to empower them to critically evaluate the content they consume, especially in news media & political campaigns.

8. Safety and Alignment Research & Development (R&D)

Safety and alignment techniques are critical for ensuring that AI models behave in a manner consistent with human values, while also mitigating risks like bias and hallucination.

Key Considerations:

- Promoting Reinforcement Learning from AI Feedback (RLAIF) and other forward-looking methods to improve AI alignment with human intentions.
- Expanding global cooperation in AI safety research, leveraging the collective expertise of international institutes and R&D labs.
- Conducting mechanistic interpretability studies to understand how AI models arrive at specific decisions and how to control dangerous capabilities, such as long-term planning or autonomous replication.

9. AI for Public Good

Beyond mitigating risks, the responsible use of AI should focus on maximizing societal benefits, democratizing access to technology, and promoting sustainable development.

Key Considerations:

- Promoting the use of AI to address global challenges, e.g., education & healthcare, while ensuring equitable access across all sectors of society.
- Supporting digital literacy initiatives to help citizens and small-to-medium enterprises safely adopt AI tools, fostering inclusivity in the AI-enabled future.
- Encouraging sustainable AI practices by tracking and reducing the carbon footprint of AI systems, particularly in model training and data center operations.

3.1.1.4 Ethical AI Framework

When developing and implementing AI systems, addressing inherent risks is crucial to ensure they are both effective and ethical. As defined in figure 9, risks associated with AI include those related to the AI model itself, such as its development, training, and the reliability of its outputs, emphasizing the need for comprehensive validation to ensure accuracy and fairness. Data-related risks involve critical issues around data quality, privacy, and security, highlighting the importance of ethical data usage and rigorous data management practices.

Furthermore, the broader system and infrastructure must be robustly designed to support AI deployment, incorporating secure technological environments and effective management. Legal and compliance risks are also significant, requiring AI systems to adhere to evolving laws and regulations, particularly those related to data protection. Finally, integrating AI into existing processes can introduce operational risks, necessitating careful planning and assessment to avoid disruptions. Addressing these varied risks comprehensively is foundational in crafting an Ethical AI Framework that aligns AI technologies with ethical standards and societal values.

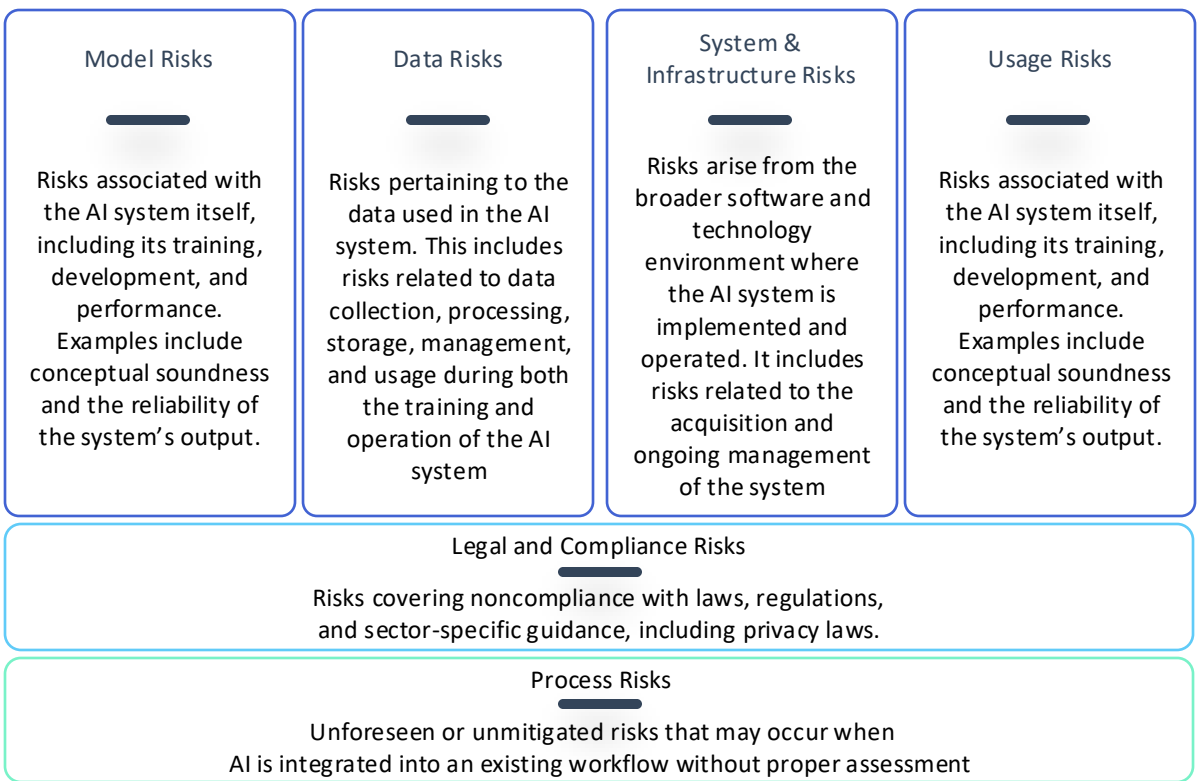


Figure 9 : Risks associated with usage of AI

The Ethical AI Framework by PwC [5] is organized into four main areas (as in Figure 10): Strategy, Control, Responsible Practices, and Core Practices. It emphasizes embedding ethical considerations into organizational values and adapting to evolving regulations to ensure AI compliance and governance. Control focuses on strong oversight, adherence to standards, and effective risk management. The Ethical Practices section advocates for transparency, fairness, sustainability, and safety in AI systems, while Core Practices highlight the importance of precise problem formulation, rigorous validation, and continuous monitoring to maintain the integrity and reliability of AI deployments.

By promoting a holistic approach that includes ensuring data privacy, reducing environmental impacts, and eliminating biases, this framework guides organizations in deploying AI solutions that are not only innovative and efficient but also ethically responsible and aligned with societal values, fostering trust and broad acceptance of AI technologies. Additionally, the framework encourages the integration of advanced security measures to protect against cyber threats and the development of robust AI systems capable of performing reliably under various conditions, further enhancing the safe and effective implementation of AI across sectors.

Figure 10 : Ethical AI Framework

To enhance the country's governance and risk management strategies, Three Lines of Defense [6] could be utilized. As defined in figure 11, the first line would include various government agencies and departments, each responsible for managing risks inherent in their operations and implementing effective control measures. This line ensures that day-to-day governance is robust and that operational risks are minimized. The second line would consist of specialized governmental bodies such as national regulatory agencies and oversight committees that provide a higher level of risk management and ensure compliance with laws and policies. These bodies monitor and support the first line by setting standards and providing the necessary tools to manage risks effectively.

The third line of defense in a country's application of this model would be an independent national audit institution or similar entity, which provides objective assurance on the effectiveness of governance, risk management, and controls implemented by the first two lines. This tier acts independently from the operations and management of government, offering unbiased scrutiny and promoting transparency and accountability within the public sector. By incorporating this structured model, countries can better safeguard against risks, enhance their regulatory compliance, and ensure public trust through greater accountability and transparency in governance.

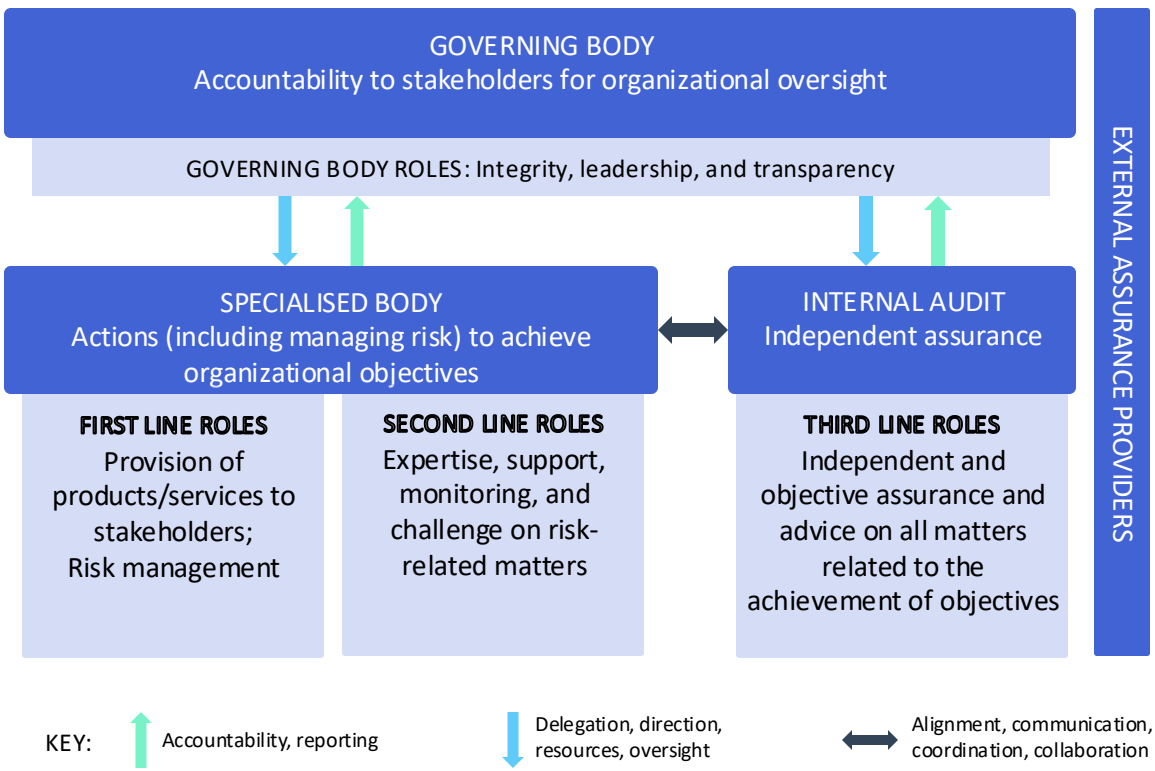


Figure 11 : 3 Line Defense

It is emphasized that nations must move from theory to practice by creating actionable guidelines that promote fairness, transparency, and accountability. The first step would be to set risk-based priorities by assessing which AI-related risks have the greatest impact on national interests, ensuring governance, compliance, and risk management focus on these. This includes enhancing cybersecurity, data governance, and privacy protections to mitigate threats such as data breaches and identity theft that can arise from malicious AI usage. Updating national data protection protocols will help protect citizen's privacy against generative AI risks, especially as it evolves.

Countries must also address model risks in AI systems, particularly when explainability is limited or absent. Governments should identify which AI systems lack transparency and put in place practices to ensure fairness, accuracy, and legal compliance, while carefully managing systems where oversight is difficult or impractical. Alongside this, it is essential to equip public sector employees and key stakeholders with knowledge of how AI works, how to use it responsibly, and how to verify or correct its outputs. Governments should also provide compliance and legal teams with skills and tools to monitor AI for risks like intellectual property violations.

Another crucial aspect is monitoring third-party providers who use AI in their services. Countries should evaluate how these vendors manage risks, ensuring that national exposure is minimized. Finally, governments should stay informed about the global regulatory landscape. As international guidelines and regulations around AI, particularly regarding privacy, bias, and governance, continue to evolve, countries must be proactive in adopting these rules to ensure responsible AI use and maintain compliance with global standards.

For more information refer page 77 which details out the Responsible AI Framework Initiative

3.1.2 Technology Infrastructure Enhancement

Developing the digital infrastructure for the future AI adoption requires a harmonized national system that fosters collaboration and adheres to ethical and regulatory frameworks. Key considerations include identifying and assessing the resources necessary for AI development, ensuring the continuous development and maintenance of infrastructure, and providing businesses and institutions with the required hardware, such as supercomputers, cloud services, and specialized systems.

To accelerate AI adoption and provide AI-as-a-Service (AIaaS) to both public and private stakeholders, governments should focus on strengthening each layer of the AI Technology Stack. Below is an elaboration of how governments can enhance each layer of the stack to create a comprehensive and scalable AI ecosystem, with the primary intention of offering AI-as-a-Service.

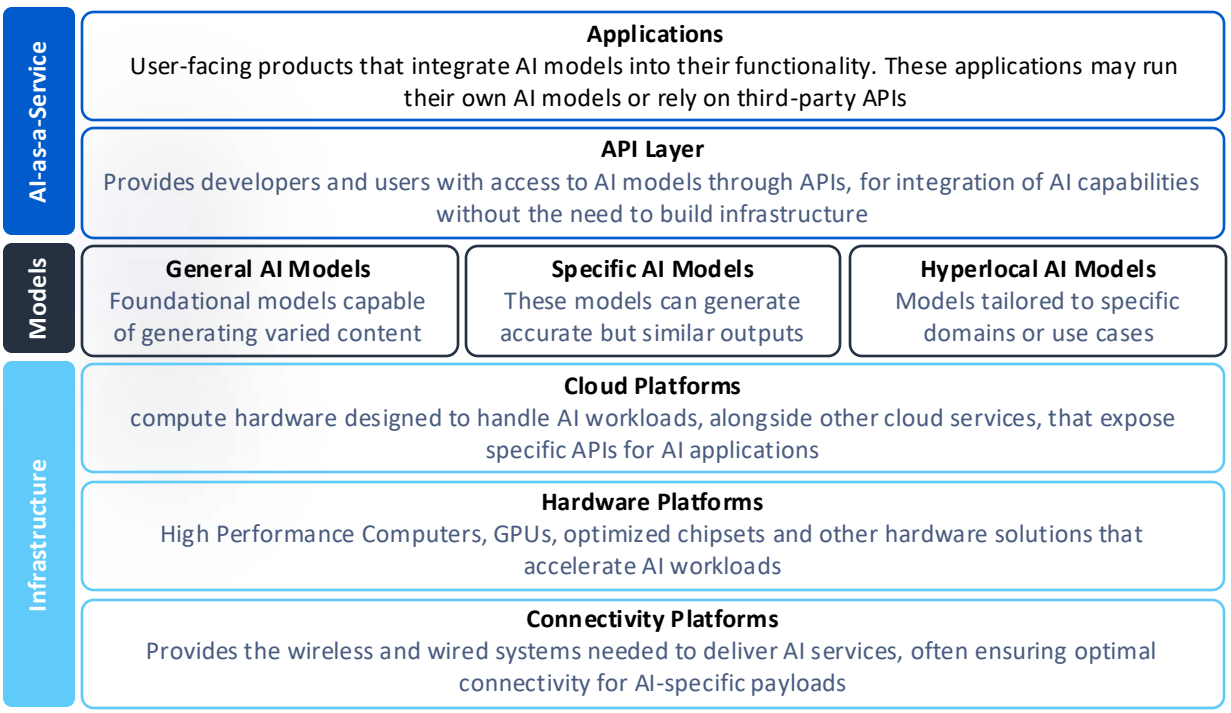


Figure 12 : AI Technology Stack

1. Applications :

Develop National AI Platform: Governments should promote the development and deployment of AI platform that address usage of AI in priority sectors like healthcare (AI-powered diagnostics), transportation (smart traffic systems), public safety, education (personalized learning), and agriculture (smart farming solutions).

Create Secure Sandbox Environments: Governments should establish secure sandbox environments where companies, startups, and researchers can test AI models and applications in a controlled and safe setting. These sandboxes allow AI developers to explore real-world applications, test innovative solutions, and ensure regulatory compliance without risking the integrity of production systems or sensitive data. These environments could be utilized for AI ethics testing, bias detection, and performance evaluation, providing a safe space for AI development.

Establish Standardized AI Testing Systems: Governments can create standardized AI testing by creating an AI testing system that evaluate AI solutions against national benchmarks for safety, security, and effectiveness. These platforms would ensure that AI applications meet predefined performance and ethical standards before being deployed at scale.

2. APIs and Middleware Platforms:

National AI APIs and Middleware Platforms: Build government-supported open APIs and make them accessible through middleware platforms, allowing developers and businesses to access AI capabilities (such as machine learning, natural language processing, or computer vision) easily. For example, a national API layer for AI that can be used for healthcare, transport, and urban planning.

Encourage API Standardization: Push for the standardization of APIs across industries, ensuring interoperability between AI systems. This would encourage the creation of modular AI systems that can integrate into larger, nationwide services.

3. AI Models (General, Specialized, and Localized):

Create and Encourage Open-Source AI Models: Governments can create and promote the use of open-source AI models, offering grants and funding to develop general-purpose models that can be adapted across multiple sectors (e.g., AI for medical diagnostics, urban planning).

Sector-Specific AI Models: Develop AI models specialized for key industries such as energy, healthcare, manufacturing, and agriculture. Governments can partner with universities and private companies to build AI models specific to national goals (e.g., climate change mitigation, disease control).

Localized AI Development: Support the development of localized AI models that are sensitive to the cultural, linguistic, and social contexts of different regions. For example, natural language processing models that understand regional languages and dialects.

4. Cloud Platforms (AI Computing Infrastructure):

National AI Cloud Services: Establish national AI cloud services that provide scalable, secure, and affordable computing resources for AI research, model training, and deployment. These could be hosted on existing government infrastructure or through partnerships with major cloud providers (AWS, Azure, GCP).

Cloud Incentives for AI Research: Provide subsidies or credits for research institutions, startups, and SMEs to use cloud computing resources for AI projects. This reduces the cost barrier for AI development and experimentation.

Edge AI Cloud: Support the deployment of edge AI solutions that process data locally (close to the data source) to enable real-time AI applications in areas such as autonomous vehicles, industrial automation, and smart cities.

5. Hardware Platforms (AI Hardware & Accelerators):

Invest in AI-Optimized Data Centers: Build or upgrade data centers with AI-specific hardware such as GPUs, TPUs, and FPGAs that support high-performance AI computation and model training. These data centers should be accessible to public institutions, universities, and private companies.

Encourage R&D in AI Hardware: Provide grants for research in next-generation AI hardware such as quantum computing, neuromorphic chips, and energy-efficient AI processors. This would position the country at the forefront of AI hardware innovation.

6. Connectivity Platforms (5G, IoT, and Network Infrastructure):

Deploy 5G Nationwide: Prioritize the rapid deployment of 5G infrastructure to provide the high-speed, low-latency connectivity required for advanced AI applications such as autonomous vehicles, smart cities, and telemedicine.

Promote Edge AI: Invest in edge AI computing infrastructure that allows devices to process data locally (on-device), reducing the need for constant connectivity and enabling faster decision-making in real-time environments, such as industrial automation and healthcare.

Broadband and Digital Inclusion: Ensure broadband access and digital connectivity in rural and underserved areas, enabling equitable access to AI-powered services and fostering innovation across the entire nation.

Refer to AI Resilience through Infrastructure Support and Enhancement Initiative in page 87 for further details on the strategic framework and its implementation.

Guide to Technology Infrastructure Decision Making

Guide to Technology Infrastructure Strategy, as described by Intel can be adopted to the national context, could provide a comprehensive roadmap to build scalable, efficient infrastructures for AI workloads. It covers the stages from basic setups to advanced, high-performance computing (HPC), focusing on the use of GPUs, cloud computing, and automation to optimize AI integration and performance. The guide emphasizes scaling infrastructure based on organizational needs, transitioning from pilot AI projects to fully scalable, real-time AI deployment systems that can handle continuous learning and heavy workloads.

Repurpose Existing Hardware	Outsource Solution Delivery	Buy a One-off Solution	Build a Broader Platform	Self-Reliance
Choose if you are: • Researching or testing ideas • Looking to gain internal buy-in	Choose if you are: • Looking for a lower cost of entry • Using mainly external data sources	Choose if you are: • Looking to deploy a solution quickly. • Only planning to adopt AI in limited fashion	Choose if you are: • More experienced in use of AI • Planning to use AI in multiple sectors	Choose this you are: • Aligned with self-reliance by bringing in-house high computing capabilities • Aim to build a sustainable infrastructure

Figure 13 : AI Infrastructure Maturity

The figure 13 demonstrates the correlation between infrastructure maturity and key commercial outcomes such as user trust, business value, and overall return on investment (ROI).

As nation progress from basic to state-of-the-art AI infrastructure, they can better support scalable AI workloads, enhance real-time processing, and improve user trust through reliable, transparent AI solutions.

This maturity ultimately leads to increased business value and a higher ROI, reinforcing the importance of continuous infrastructure optimization. Infrastructure maturity is a key factor in enabling scalable and efficient AI development. As organizations progress through maturity levels, they transition from basic infrastructure setups with limited capabilities to advanced, high-performance computing environments with robust GPUs and cloud-native strategies. Mapping these options to AI maturity levels can provide organizations with a pathway to progressively strengthen their AI infrastructure and capabilities.

- Option of "Repurpose Existing Hardware" align with entities at the beginning of their AI journey(level 1), focusing on low-cost experimentation, gaining internal buy-in, and testing ideas without heavy investment.

- "Outsource Solution Delivery" suits entities in a level 2 maturity phase where they seek quick access to AI capabilities at a lower cost, primarily relying on external data and expertise while building initial competencies.

- "Buy a One-off Solution" is ideal for entities wanting immediate results in specific areas without committing to extensive AI adoption. It represents a level 3 maturity, achieving focused impact without a comprehensive infrastructure overhaul.

- "Build a Broader Platform" applies to more mature level 4 entities aiming to integrate AI widely across multiple sectors. This phase demands increased experience and internal capability to leverage AI at scale.

- The "Self-Reliance" option represents the highest maturity level, with entities investing in in-house HPC, GPU, and TPU infrastructure for a sustainable, self-reliant AI ecosystem. This level of maturity supports long-term, resilient AI capabilities, reducing dependency on external providers and enabling innovation through complete internal control over data and processing power.

This growth allows for the optimization of AI workloads, real-time processing, and continuous learning. With each stage of maturity, organizations can better support complex AI tasks, improve system reliability, enhance user trust, and ultimately drive greater business value and return on investment (ROI).

Refer the National AI workbench for collaborative research, development, and innovation and AI Resilience through Infrastructure Support and Enhancement initiative in appendix 4.3 (page 80 and 87) for further details on the strategic framework and its implementation.

Development of AI

It is crucial to enable sector-specific focus areas to accelerate AI adoption. This approach ensures that AI solutions are aligned with national priorities while addressing the unique needs of key sectors. The focus areas include:

Developing AI as a distinct focus area	Usage of AI on high priority sectors such as healthcare, education, and public services

Establishing AI as a critical focus area within the economy is essential for driving innovation and embedding AI into various sectors. Positioning AI as a central part of the national strategy ensures that its potential is fully harnessed to boost productivity, improve services, and drive digital transformation.

AI has the potential to transform specific sectors such as healthcare, education, public services, and agriculture, enhancing operational efficiency, improving decision-making, and optimizing service delivery. Prioritizing AI adoption in these key sectors will drive economic growth and improve societal outcomes.

Additionally, three types of AI models need to be deployed and/or developed to support the implementation of AI applications across the nation.

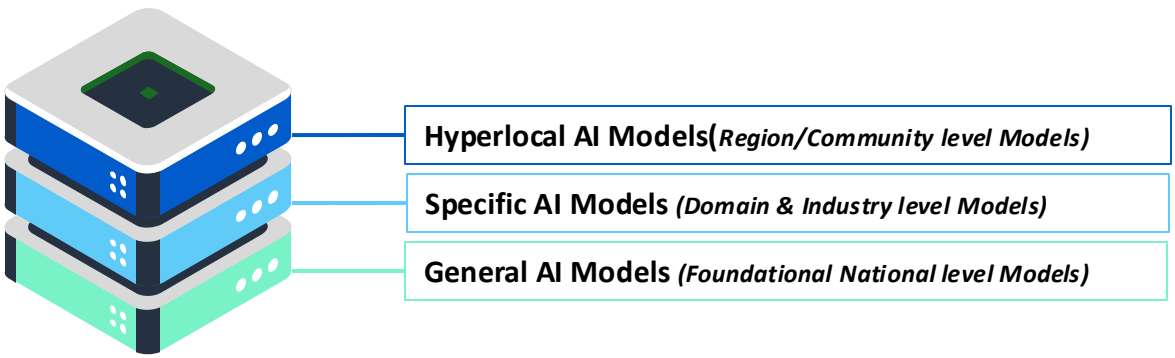


Figure 14: Three-tier AI Model Approach

1. General AI Models

General AI Models are foundational models that are trained on vast and diverse datasets, designed to perform a wide range of tasks across multiple domains without being tied to any specific industry or use case. These models have broad capabilities, such as understanding natural language, generating text, recognizing images, and performing tasks that are applicable across many sectors.

A country should consider developing General AI models if it seeks to:

- Establish global leadership in AI and drive widespread innovation across industries.
- Ensure technological and data sovereignty, reducing reliance on foreign technology.
- Foster a AI ecosystem that supports local businesses, startups, and researchers.
- Embed ethical standards into AI development to align with national values.

However, the decision to invest in General AI development must also account for costs, talent availability, and the potential to leverage existing models. Countries that face resource limitations may find it more practical to focus on sector-specific AI models, form strategic partnerships, or adapt open-source models for their unique needs, ensuring that AI adoption aligns with their goals and capabilities.

2. Specific AI Models

Specific AI models are developed for particular industries or domains but are generally applicable across an entire sector, region, or even the nation. For example, a medical imaging AI model trained on large datasets of X-rays can be used in hospitals across the country, irrespective of geographic location. Example: A model trained for financial fraud detection could work for any financial institution or banking system.

Specific models can take advantage of national level general AI models to create an output that is more aligned with the nation's views.

3. Hyperlocal AI Models

Hyperlocal AI models are developed for a specific region, community, or local environment. They are trained on datasets specific to a particular locality or use case, making them highly specialized for solving problems unique to that region. Example: An AI model designed to optimize irrigation systems based on the specific soil and weather conditions of a particular agricultural zone. Hyperlocal models can take advantage of national level general AI models as it would have been trained to local data in comparison to open-source models.

By focusing on AI as a key area and developing AI models across General, Specific, and Hyperlocal levels, governments can accelerate the integration of AI into key sectors, drive innovation, and improve efficiency. Developing sector-specific roadmaps for healthcare, education, public services, and agriculture ensures that AI adoption addresses the country’s unique needs and challenges. As defined in figure 17, the three-tier AI model approach supports scalable, specialized, and localized AI solutions that collectively drive transformation across all sectors.

3.1.3 Education, Awareness & Skill Development

The framework mentioned in figure 15, outlines key considerations for preparing society and the economy to harness AI opportunities while managing associated risks. It focuses on leveraging education, training, and critical thinking to build AI competence, raise awareness, and expand the expert base across various sectors.

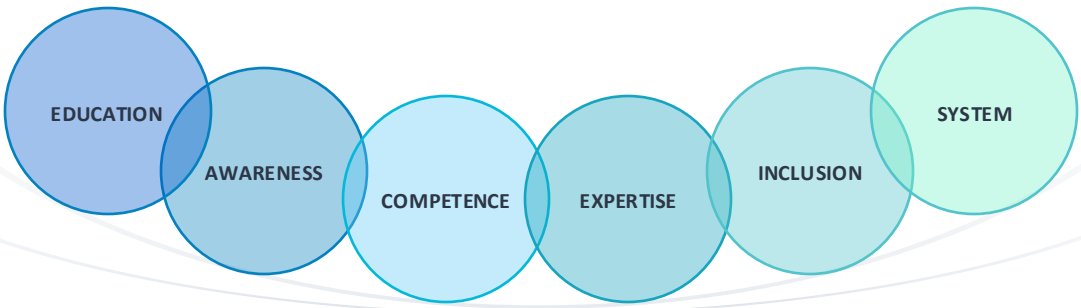


Figure 15: Education, Awareness & Skill Development Components

1. Leveraging Education and Training for AI Opportunities

- The focus is on preparing society and the economy to utilize AI's opportunities and manage associated risks, with an emphasis on education and training.
- The development of capabilities requires situational assessments and forecasts of the labor market. Continuous collaboration between professional sectors, workshops, and education systems is essential.

2. Raising Awareness and Critical Thinking About AI Technologies

- It is essential to make AI knowledge accessible to society and raise awareness of its benefits, risks, and potential drawbacks. Critical thinking about AI technologies is crucial, especially regarding opaque algorithms. Young people, parents, and educators must be prepared for AI's potential dangers and risks. Cooperation with formal and non-formal education systems, along with professional organizations, is necessary to build awareness.
- **Key Actions:**
    - Establish AI Innovation Centers for information sharing, social dialogue, and training needs.
    - Implement programs to raise awareness and educate 1 million people, with training for 100,000 individuals through basic AI courses.
    - Provide AI content in public education, support career orientation, and prepare teachers for AI instruction.

3. Developing AI Competence and Expanding the Expert Base

- Addressing the shortage of specialists is key by equipping managers and experts with knowledge to assess AI's potential in various sectors, such as manufacturing, healthcare, agriculture, and public administration.
- **Key Actions:**
    - Introduce training programs for SME managers, experts, and public sector workers.
    - Promote demand for AI retraining and provide corporate grants.
    - Develop data asset management training for public administration.

4. Enhancing Data Specialist and Research Expert Capacity

- To expand AI capabilities, increasing the capacity of data specialists, developers, and researchers is critical.
- **Key Actions:**
    - Supervise and develop AI-related undergraduate and graduate programs.
    - Encourage AI's use in research methodologies and increase AI topics in doctoral studies.
    - Establish AI scholarships and facilitate networking among researchers, institutions, and international experts.
    - Attract AI experts to strengthen the local workforce.

5. Inclusion and Talent Development

- Focus on providing personalized AI-driven learning for vulnerable groups such as the disabled, elderly, or digital illiterates.
- Early identification and support for talented individuals is essential.
- **Key Actions:**
    - Collect and translate international guidance materials for at-risk groups.
    - Introduce educational games to enhance logical and mathematical skills.
    - Offer mentorship, both online and in person, to nurture young talents.

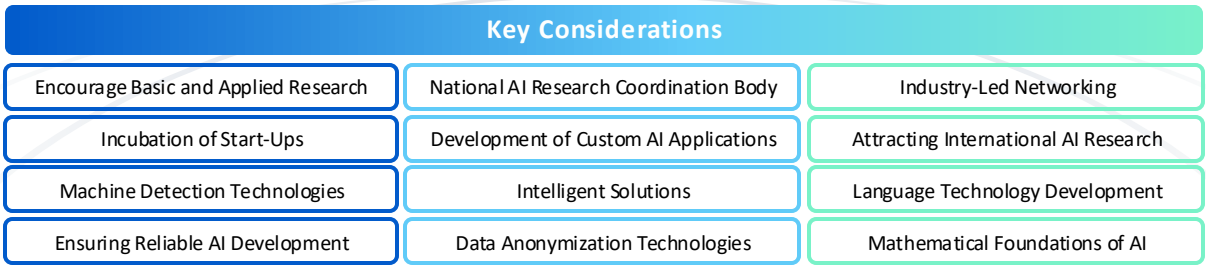
6. Role of Education Systems

- Achieving these goals requires integrating them into formal education (public, vocational, higher, and adult education) and non-formal learning.
- **Key Role:** Higher education plays a pivotal role in personal competence development with AI support, aligning closely with the education system's transformative responsibilities.

Refer to Free AI Training, Certification, and Intensive Upskilling Programs Initiative in page 85 for further details on the strategic framework and its implementation.

3.1.4 Enable R&D and Innovation

The emphasis is on building research synergies by positioning technology developers strategically and recognizing innovators. The goal is to promote collaboration in research and development, forming a technology-driven ecosystem that draws on both domestic and international partnerships. This pillar aims to foster AI research excellence by integrating it within a comprehensive ecosystem.



1. Encouraging Basic and Applied Research in Key Technological Areas

1. Focus on both fundamental and applied research in critical areas like machine vision, language processing, and data anonymization.
2. Expand research efforts to industry-specific applications, including healthcare, manufacturing, agriculture, and defense technologies.
3. Aim to present internationally recognized research outcomes by fostering collaborations that bridge academic research and industry needs.
4. Given limited resources, ensure careful alignment and coordinated use of R&D investments to maximize impact and drive meaningful AI advancements.

2. Establishing a National AI Research Coordination Body

1. Create a central research coordination hub (e.g., a National AI Laboratory) to serve as a link between research institutions, industry, and global AI communities.
2. This body should facilitate collaboration across basic and applied research initiatives while aligning with international standards and research networks.
3. Include a focus on civilian, dual-use, and defense technologies, joining relevant international defense-related programs to leverage global resources and knowledge.
4. Act as a strategic coordinator to attract international research centers, enhancing the country's AI ecosystem.

3. Fostering Industry-Led Networking in AI Research

3. Build collaborative networks between AI researchers and industries such as public administration, healthcare, and manufacturing.
4. Ensure that research is aligned with real-world needs by facilitating partnerships that allow industry to guide innovation.
5. Establish national coordination mechanisms to align domestic research with industrial challenges, thus ensuring AI innovations are practical and impactful.

4. Supporting the Incubation of Start-Ups and Fostering AI Innovation

1. Encourage the growth of start-up companies that can develop scalable AI solutions by offering targeted resources and support.
2. Provide access to open data resources, establish networks of early adopters, and create AI-specific accelerators to drive innovation.
3. Facilitate the development of AI-specific investment funds and sector-specific grants to foster innovation in key industries.

5. Facilitating the Development of Custom AI Applications

1. Ensure that companies have opportunities to develop and deliver custom AI solutions tailored to sector-specific needs.
2. Support innovation through AI marketplaces, innovation awards, and academic collaborations to drive the widespread adoption of AI technologies.
3. Foster a culture of experimentation, encouraging organizations to explore new AI solutions and contribute to the growing AI ecosystem.

6. Attracting International AI Research Centers

1. Position the country as a global hub for AI research by highlighting strengths such as a favorable regulatory environment, high-quality research capabilities, and a well-developed ecosystem.
2. Offer tax incentives and establish clear academic partnership frameworks to attract international research centers.
3. Promote the relocation of global AI research institutions to enhance domestic AI expertise and infrastructure, while integrating local research with international efforts.

7. Advancement of Machine Detection Technologies

1. Develop and customize machine detection systems to improve the integration of sensor data from sources like cameras, LIDAR, and radar.
2. Focus on medical imaging to enhance human health outcomes and apply machine detection in manufacturing and agriculture to reduce costs and increase efficiency.

8. Development of Intelligent Manufacturing, Logistics, and IoT Solutions

1. Machine learning is essential for analyzing the vast data produced by connected devices in IoT systems. This requires complex optimization algorithms and the ability to make decisions without human intervention.
2. Research should focus on the stability of machine learning systems, with the goal of implementing predictive control algorithms and ensuring reliable decision-making in complex environments.

9. Language Technology Development

1. The development and enhancement of language technologies are critical, especially for languages that require further advancements in AI processing capabilities.
2. Focus on creating language processing tools that bring smaller or underrepresented languages to the same level of development as major global languages, ensuring their relevance in the digital era.

10. Ensuring Reliable AI Development

1. AI systems must be transparent, predictable, and able to detect and correct errors. Developing reliable AI involves creating test environments, making decision-making mechanisms explicit, and integrating hybrid models to support interpretable decisions.
2. These advancements will make AI applicable in critical decision-making scenarios and foster trust in human-AI collaboration.

11. Development of Data Anonymization Technologies

1. Data is essential for AI, but only anonymized personal data should be used in training models. Develop new technologies and processes to ensure that personal data remains secure, even in complex environments, while balancing user privacy with the need for data sharing.

12. Development of Mathematical Foundations of AI

1. Current AI techniques, such as machine learning and deep learning, are based on advanced mathematical concepts. However, further research is needed to fully understand the mathematical foundations and limitations of these methods.
2. Explore new mathematical theories that promise breakthroughs in AI performance, such as dimensionality reduction and graph theory, which can lead to significant improvements in neural network architectures and optimization methods.

Refer to AI Startup Accelerator Programs Initiative in page 89 for further details on the strategic framework and its implementation, and to AI Innovation sandbox for development initiative page 78.

3.1.5 Build Data Economy

Building a data-driven economy involves creating an ecosystem where data is treated as a valuable asset that drives innovation, enhances decision-making, and fosters economic growth. This requires a robust infrastructure for data collection, storage, sharing, and analysis, alongside strong governance frameworks that ensure data privacy, security, and ethical use. A thriving data economy enables businesses, governments, and institutions to leverage data for competitive advantage, spurring the development of new products, services, and technologies across sectors. As mentioned in figure 16, key enablers for a robust data economy are:

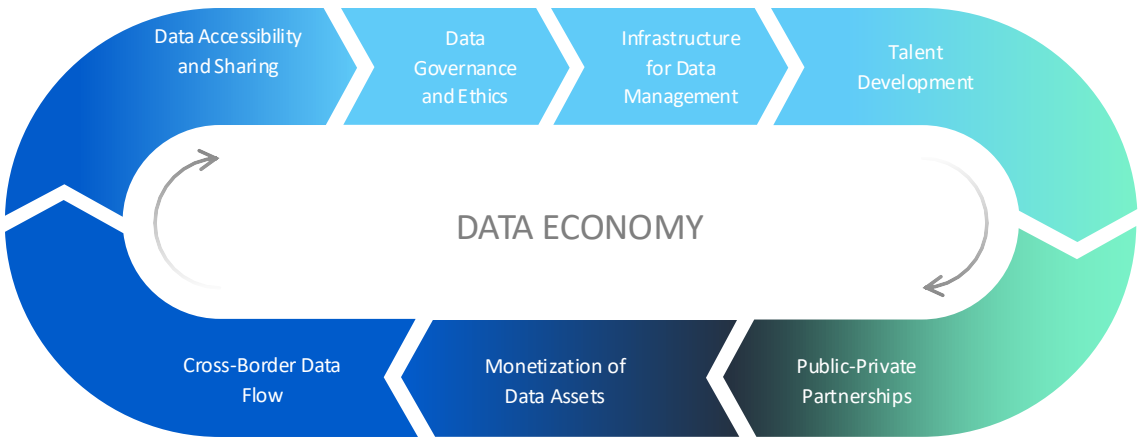


Figure 16: Data Economy Enablers

1. Data Accessibility and Sharing

Data accessibility is crucial for unlocking the full potential of a data-driven economy. Open access to data promotes innovation, enhances decision-making, and allows both the public and private sectors to derive value from data. Ensuring secure and regulated access to data enables collaboration and development across industries.

Key Actions:

Establish Open Data Platforms: Governments and institutions should create open data platforms that allow access to non-sensitive public datasets, such as environmental data, traffic statistics, or infrastructure information, to stimulate innovation and economic growth.

Create Data Marketplaces: Governments can develop or support data marketplaces that allow businesses, researchers, and public organizations to buy, sell, and exchange data in a regulated environment. This facilitates the monetization of data assets while ensuring compliance with data privacy and security standards. These marketplaces should offer transparency in data provenance and quality, helping participants trust the data they acquire.

Compliance with Privacy Regulations: Ensure that data-sharing frameworks comply with international and national privacy regulations (such as GDPR or other local laws) and provide mechanisms for encryption and anonymization of sensitive data.

Fostering Data Interoperability: Establish standards and protocols that allow for seamless data exchange across platforms, systems, and sectors, ensuring data remains actionable and reusable by different stakeholders.

Example: A national data marketplace where businesses can purchase anonymized consumer data to refine AI models or optimize products, while governments share public datasets (e.g., city planning data) to encourage smart city development.

2. Data Governance and Ethics

Strong data governance frameworks ensure that data is used responsibly, securely, and ethically. This is crucial for building trust in data-driven initiatives, protecting individual privacy, and avoiding biases or misuse of data.

Key Actions:

Create a National Data Governance Framework: Governments should implement clear policies that define data ownership, privacy protections, and accountability measures. These frameworks should also include mechanisms to audit and enforce data regulations.

Promote Ethical Data Use: Establish ethical guidelines for the collection, processing, and usage of data, especially in sensitive areas like healthcare, law enforcement, or social services. Address biases in AI algorithms and ensure transparency in how data is used.

Build Trust through Data Stewardship: Governments and businesses must adopt practices that promote transparency and accountability in data collection and use. This includes informing citizens about data use and obtaining explicit consent where necessary.

Example: The creation of data ethics boards or commissions to oversee large-scale public data projects, ensuring compliance with ethical standards and preventing the misuse of data.

3. Infrastructure for Data Management

A data-driven economy requires a scalable and resilient infrastructure capable of handling large volumes of data while enabling real-time analysis. This includes storage solutions, data processing capabilities, and analytical tools.

Key Actions:

I**nvest in Scalable Data Infrastructure:** Governments should invest in cloud platforms, data lakes, and data warehouses that can store and process large datasets efficiently. These systems must have the capacity to scale with growing data needs across industries.

Data Security and Protection: Build robust cybersecurity frameworks to protect data assets from breaches, theft, or unauthorized access. Use encryption and other security measures to protect sensitive and critical data.

Example: National data centers or cloud infrastructure designed to support high-performance computing and large-scale data processing across public and private sectors.

4. Talent Development

The success of a data-driven economy depends on a skilled workforce capable of collecting, analyzing, and interpreting data. Fostering data literacy at all levels—from basic skills to advanced analytics and AI development—is essential to drive innovation and economic value.

Key Actions:

Educational Programs in Data Science: Governments should collaborate with educational institutions to promote programs focused on data science, machine learning, AI, and analytics. This includes offering degrees, certifications, and vocational training.

Promote Data Literacy: Implement data literacy programs for non-technical professionals to ensure that decision-makers across all sectors can understand and act on data-driven insights.

Public-Private Training Programs: Foster partnerships between universities, businesses, and governments to provide hands-on training opportunities in data analytics and AI.

Example: National initiatives that offer scholarships, boot camps, and online courses focused on data science, and promote AI research hubs to develop top-tier talent in AI and analytics.

5. Public-Private Partnerships

Collaboration between governments, private businesses, and research institutions is essential to co-create value from data. Public-private partnerships can accelerate innovation, drive the development of data-driven products and services, and foster the sharing of resources.

Key Actions:

Establish Collaborative Research Projects: Governments can incentivize collaboration between the private sector and academic institutions to solve industry-specific challenges using data and AI (e.g., agriculture, healthcare, smart cities).

Data-Sharing Agreements: Encourage data-sharing agreements that balance the need for innovation with the protection of sensitive information. Governments can provide a framework to ensure that such partnerships are fair and transparent.

Innovation Hubs: Create AI and data innovation hubs that provide a controlled environment for testing and scaling data-driven solutions, particularly in areas like FinTech, HealthTech, or AgriTech.

Example: Governments can partner with tech companies to launch initiatives like AI-driven health interventions, leveraging data to improve living or health outcomes.

6. Monetization of Data Assets

Data has immense economic value when properly leveraged. Developing strategies to commercialize data assets can create new revenue streams for both private and public sectors. However, it is crucial to balance monetization with ethical and fair practices.

Key Actions:

Create Frameworks for Data Monetization: Governments can support the development of data markets or platforms where anonymized data can be bought and sold, allowing businesses to monetize their data assets while ensuring privacy and compliance.

Develop Data Sharing and Licensing Models: Establish clear guidelines and licensing models for the commercial use of public or shared datasets. These models should encourage innovation while safeguarding against exploitation or unfair data practices.

Promote Fair Data Trade Practices: Ensure that companies participating in the data economy adhere to ethical guidelines and fair-trade practices, particularly in terms of data privacy and security.

Example: Public datasets on urban infrastructure or environmental data can be shared with companies developing smart city solutions, while ensuring fair compensation for data usage.

7. Cross-Border Data Flow

Data-driven economies thrive on the global exchange of information. Cross-border data flows enable collaboration, innovation, and trade across regions. However, they must be managed in line with data privacy laws and national security considerations.

Key Actions:

Facilitate International Data Standards: Collaborate with international organizations to create globally accepted data-sharing standards and privacy protocols that ensure the seamless flow of data across borders while respecting local laws.

Create Bilateral and Multilateral Data Agreements: Establish agreements with other nations that allow for the secure transfer of data, particularly for sectors like finance, healthcare, and e-commerce, where cross-border data flows are critical.

Balance Privacy with Innovation: Ensure that data sharing across borders does not violate individual privacy rights or national security. Implement measures like data localization for critical sectors while promoting open data in others.

Example: Governments can participate in international data frameworks (like GDPR harmonization or APEC Cross-Border Privacy Rules) that allow the secure exchange of data for global businesses.

Refer to National Data Program page 86 for further details on the strategic framework and its implementation, and to AI Startup Accelerator Programs Initiative in page 89.

3.1.6 Incentivize AI Uptake

Incentivizing the uptake of artificial intelligence (AI) is essential for driving innovation and competitiveness across industries. As AI continues to revolutionize business operations, creating an environment that encourages experimentation, knowledge sharing, and collaboration becomes vital. A structured approach that fosters AI development, supports startups, and enables small and medium-sized enterprises (SMEs) to adopt AI is key to building a thriving AI ecosystem. Figure 17 outlines practical steps to incentivize AI experimentation and adoption, leveraging strategic initiatives and infrastructure to accelerate AI integration into various sectors.

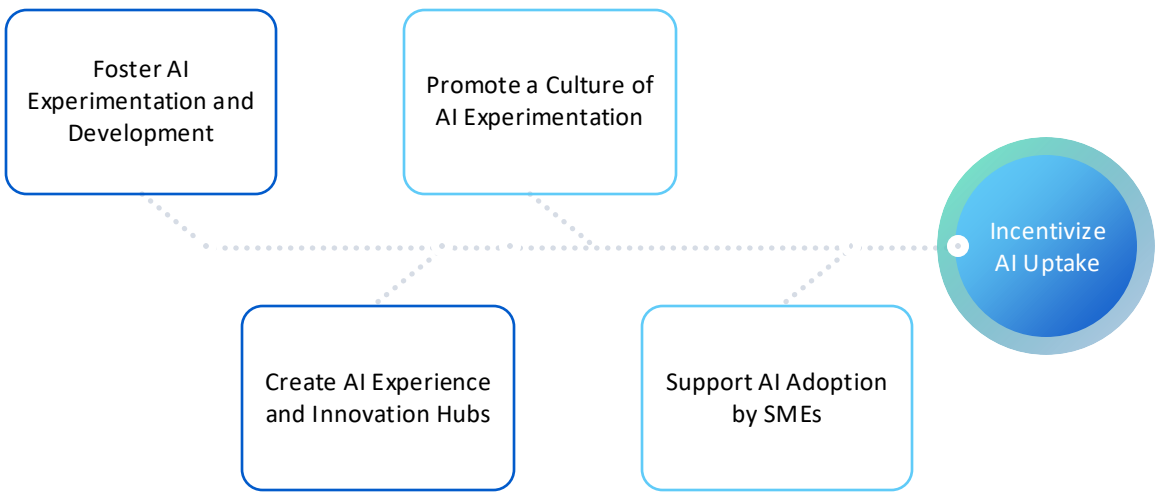


Figure 17: AI Uptake Incentivization Key Steps

1. Foster AI Experimentation and Development

Experimentation is key to discovering new use cases for AI and driving innovation across sectors. Many industries are still in the early stages of AI adoption, and fostering experimentation allows companies to explore how AI can enhance their operations, products, and services.

Key Actions:

Support AI R&D and Proof of Concept (PoC) Projects: Governments should establish grants or subsidies to support AI projects, particularly those aimed at developing Proof of Concept (PoC) applications. This support can help startups and enterprises explore AI's potential in real-world scenarios, accelerating the commercialization of AI technologies.

Create Innovation Value Chains: Governments can develop frameworks that link universities, research centers, and industries to facilitate AI knowledge transfer. This will create a robust innovation value chain, where research leads to PoC projects that eventually scale into commercially viable AI solutions.

Establish Market Collaboration Platforms: Governments should promote platforms that bring together AI solution providers, businesses, and investors, allowing them to collaborate, share insights, and identify opportunities for AI integration across different sectors.

Example: A government-funded initiative that provides financial incentives to companies working on AI Proof of Concepts in industries such as healthcare, agriculture, or manufacturing, allowing them to scale these solutions into market-ready applications.

2. Promote a Culture of AI Experimentation

Establishing a strong culture of AI experimentation is crucial for generating momentum around AI adoption. By creating the right incentives and infrastructure, governments can encourage businesses of all sizes to explore how AI can improve their operations and drive competitive advantage.

Key Actions:

Launch AI Start-up Accelerators: Governments can establish or fund AI startup accelerators that provide mentorship, access to funding, and infrastructure support to new AI ventures. This will help startups fast-track the development and deployment of AI technologies.

Public Procurement for AI Startups: Governments can stimulate AI innovation by incorporating AI into public procurement policies, making it easier for startups to work with government agencies. This can provide startups with a steady stream of contracts and opportunities to test their technologies in real-world applications.

Create AI Marketplaces: Establish AI marketplaces that connect startups, SMEs, large corporations, and researchers. These marketplaces enable the sharing of AI solutions, datasets, and models, creating a collaborative environment for experimentation and innovation.

Example: A national AI marketplace where companies of different sizes and industries can connect to exchange AI solutions and collaborate on projects, with specific incentives provided for startups that participate.

3. Create AI Experience and Innovation Hubs

AI experience centers and innovation hubs provide the physical and virtual infrastructure required for businesses to experiment with and implement AI. They offer an environment where companies can test their AI ideas without incurring high upfront costs, driving the broader adoption of AI solutions.

Key Actions:

Establish AI Experience Centers: Governments can create AI Experience Centers that provide physical and virtual spaces for companies to experiment with AI tools and technologies. These centers can showcase AI applications and offer training sessions to help businesses better understand AI's potential.

Create AI Centers of Excellence: Establish AI Centers of Excellence (CoE) that serve as innovation hubs, providing resources for companies and startups to explore AI. CoEs can host innovation sandboxes and provide a national AI workbench, allowing businesses to experiment with AI models and datasets in a safe, controlled environment.

Offer Funding and Risk Mitigation Support: Governments should provide funding to cover the costs associated with the PoC phase of AI projects, reducing the financial risk for businesses. Offering tax credits or grants for AI projects can further incentivize experimentation.

Leverage Innovation Sandboxes: Encourage the creation of innovation sandboxes where businesses can trial AI solutions under a controlled regulatory environment, ensuring that solutions are developed responsibly while allowing room for creative experimentation.

Example: An AI Centre of Excellence that provides startups with the resources and computing infrastructure needed to test and refine AI algorithms, alongside government-backed funding for projects that show high potential.

4. Support AI Adoption by SMEs

SMEs often face significant barriers to adopting AI, including lack of access to expertise, capital, and technical infrastructure. Supporting AI adoption in SMEs is critical for democratizing AI, ensuring that the benefits of AI are distributed across the economy, and improving the competitiveness of smaller businesses.

Key Actions:

Build AI Toolkits for SMEs: Governments should develop and provide AI toolkits tailored specifically for SMEs. These toolkits should include low-cost, easy-to-use AI applications, templates, and best practices that SMEs can integrate into their operations with minimal technical expertise.

Provide AI Training and Consultation Services: Offer training programs and consultation services that help SMEs understand how AI can be applied to their specific industries and operations. These programs can include online courses, workshops, and one-on-one consultations with AI experts.

Leverage Existing SME Support Networks: Use existing SME support networks and government-backed agencies to distribute AI resources and training materials. Governments can also facilitate peer-learning platforms, allowing SMEs to share their experiences, challenges, and success stories in AI adoption.

Access to Funding and Grants: Provide SMEs with access to low-interest loans, grants, or subsidies specifically aimed at AI adoption. Financial support reduces the cost barrier for SMEs to invest in AI technologies.

Example: A government-backed AI adoption program that offers SMEs access to simplified AI tools and training, alongside financial grants to cover implementation costs, fostering a wider uptake of AI technologies in smaller businesses.

Refer to AI Center of Excellence, Innovation Hub and Incubation Center initiative, page 79 for further details on the strategic framework and its implementation

3.2 SECTOR SPECIFIC FOCUS AREAS

3.2.1 Focus Sectors

To decide its focus sectors for AI adoption, a country should align AI implementation with its national priorities, economic impact potential, and sector-specific challenges. By identifying areas that are critical to the nation's development, such as healthcare, education, agriculture, or public services, governments can leverage AI to address pressing issues like improving public welfare, enhancing productivity, and driving innovation. Economic sectors that show high growth potential, contribute significantly to exports, or have the potential for job creation should also be prioritized for AI adoption to maximize returns and competitiveness. Additionally, focusing on sectors that already have strong digital infrastructure and data availability can accelerate the implementation of AI.

Countries should also consider the readiness of specific sectors for AI, including existing infrastructure, data ecosystems, and workforce capabilities. Sectors like finance, telecommunications, and manufacturing, which have well-established data systems and a digitally literate workforce, are often more prepared to adopt AI solutions. Furthermore, analyzing international AI trends and success stories can help countries adapt global innovations to fit their local needs, ensuring they remain competitive while solving unique domestic challenges. By strategically selecting sectors for AI adoption, governments can foster national growth and ensure AI's positive impact across critical industries.

Figure 18: DCO Member States Focus Areas

Figure 18 displays the prioritization of different sectors for AI adoption or development, as revealed by a survey conducted among the DCO Member States. The survey results indicate that sectors such as healthcare, public services, agriculture, education, and transportation are considered high-priority areas for focus. The specific sectors prioritized for AI development can vary between countries, depending on their unique challenges, priorities, and readiness levels.

3.2.2 Sectoral Initiatives

Sectoral AI initiatives refer to strategic efforts aimed at integrating artificial intelligence technologies within specific sectors or industries to solve targeted problems, enhance productivity, drive innovation, improve efficiency, enhance service quality, and achieve cost savings. These initiatives are typically tailored to the unique needs and characteristics of each sector, to address sector-specific challenges and opportunities.

Leading Economy Sectors are high-contributing industries to GDP and employment, like finance, energy, and manufacturing. National Priority Sectors are those that governments emphasize for future resilience and strategic goals, including renewable energy, healthcare, and digital transformation. Identifying AI initiatives in these sectors is critical, as tailored artificial intelligence solutions meet the specific needs of distinct industries, enhancing their efficiency and productivity. By integrating AI, sectors such as healthcare, agriculture, education, and finance can automate routine tasks, optimize processes, and achieve high levels of accuracy in tasks like diagnosis or fraud detection. This targeted application of AI not only boosts operational efficiency but also fosters innovation, allowing sectors to develop new services and products, leading to competitive advantages and stimulating economic growth.

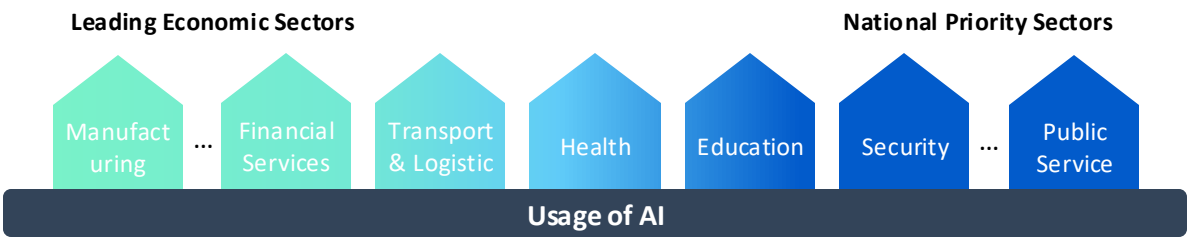


Figure 19: Balancing between Key Economy and National Priority Sectors

While AI technologies automate certain functions, they also create new job opportunities and require new skill sets, thereby contributing to job creation and educational advancements. Customized AI applications ensure that the benefits of AI are fully harnessed to meet local and sector-specific needs, making these initiatives essential for sustainable development in the modern digital economy. Furthermore, balancing between leading economy sectors and national priority sectors allows AI initiatives to align with broader economic goals while addressing key national priorities, ensuring comprehensive growth and resilience across sectors.

This AI playbook outlines sector-specific initiatives across a range of industries, including Healthcare, Public Services, Education, Energy, Transportation, Agriculture, Security, Oil & Gas, and Tourism. It is designed to assist countries in initiating AI adoption by providing detailed guidance on how to implement AI across these sectors. *For additional information, refer to Appendix 4, Page 92.*

3.3 TRANSFORMATIONAL PROGRAMS

The National Transformational Program framework (Figure 20) offers a comprehensive approach, integrating essential components for the successful adoption and scaling of initiatives in national programs.

In the planning phase, the national AI nodal agency collaborates with key economic and national priority sectors to identify and prioritize initiatives that align with national objectives. This results in a clear roadmap that integrates these initiatives into the broader national agenda, ensuring coherence and strategic direction in achieving transformational outcomes. The Initiative Prioritization Methodology (Page 129) can be applied to evaluate and rank these initiatives. By selecting the top 5 to 7, or a combination of high-priority initiatives, this approach ensures a targeted and strategic focus on advancing national development priorities.

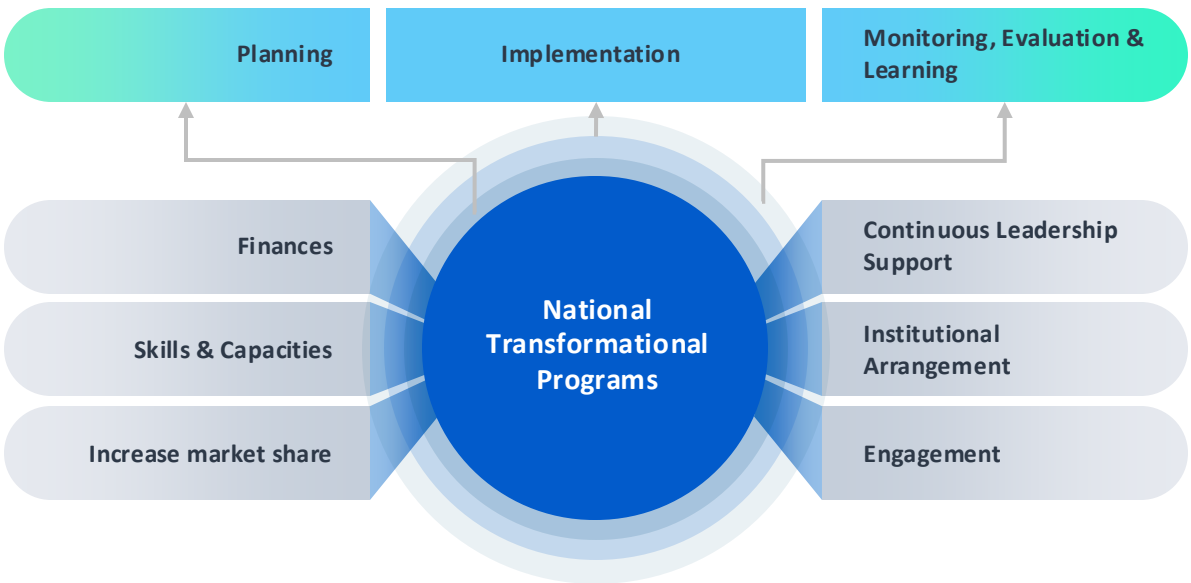


Figure 20: National Transformational Program Framework

In the Implementation phase, attention shifts to the actual execution of initiatives, ensuring that resources, governance structures, and cross-sector coordination are properly established. For successful implementation, strong leadership, institutional arrangements, and active stakeholder engagement are crucial to align each initiative with the overall objectives of the transformation program.

The Monitoring, Evaluation & Learning phase ensures continuous assessment and progress tracking, allowing for data-driven feedback and adjustments. This phase is critical for refining initiatives and maximizing their impact over time.

This framework promotes flexibility, accountability, and collaboration, all vital for executing large-scale transformational programs effectively.

APPENDIX

Appendix 1
Model National AI Strategy Outline

MODEL NATIONAL AI STRATEGY OUTLINE (1/3)

The following Model National AI Strategy provides a starting point to the nations to detail out their strategy and accelerate AI adoption, ensuring economic growth, innovation, and responsible AI usage through coordinated efforts across critical pillars.

Vision

To position Country X as a global leader in AI innovation, enhancing economic growth, improving public services, and fostering societal well-being through ethical and inclusive AI adoption.

Objectives

1. Accelerate AI adoption across key sectors.
2. Establish a strong governance framework for responsible AI use.
3. Develop AI infrastructure and foster a skilled workforce.
4. Promote AI-driven economic growth and entrepreneurship.
5. Foster international collaboration in AI.

Pillars

1. **Policies & Regulations**
    - Purpose: Develop regulations to foster AI innovation while safeguarding ethical standards.
    - Key Actions:
        - Create AI governance frameworks for privacy, security, and fairness.
        - Establish cross-ministerial AI committees for coordinated efforts.
2. **Research & Innovation**
    - Purpose: Strengthen AI research to foster innovation and development.
    - Key Actions:
        - Provide R&D grants for AI-driven projects.
        - Create AI innovation hubs to promote collaboration between academia, industry, and government.
3. **AI Skilling & Workforce Development**
    - Purpose: Build a skilled workforce ready to drive AI innovation.
    - Key Actions:
        - Integrate AI education into national curriculums.
        - Launch reskilling and upskilling programs to support the transition to AI-driven jobs.

MODEL NATIONAL AI STRATEGY OUTLINE (2/3)

4. **Digital Economy & AI Ecosystem**
   - Purpose: Build a strong digital infrastructure and AI ecosystem.
   - Key Actions:
     - Develop AI cloud platforms and data-sharing systems.
     - Create open data standards to support AI development.
5. **International Collaboration**
   - Purpose: Foster partnerships with global AI leaders to accelerate knowledge exchange.
   - Key Actions:
     - Build AI cooperation agreements with leading nations and organizations.
     - Participate in international AI ethics and regulatory bodies.

Goals

1. **Capacity Building**
   - Train 100,000 AI professionals by 2028.
   - Build a national AI cloud infrastructure by 2025.
2. **Investment Goals**
   - Foster AI research with R&D grants.
   - Increase AI adoption across sectors by 30% by 2027.
3. **Adoption Targets**
   - Ensure 100% of government services are AI-driven by 2026.
   - Increase AI's contribution to GDP by 15% by 2030.
4. **Regulatory Framework**
   - Implement AI governance frameworks by 2024, ensuring privacy, security, and ethical standards.

Implementation Plan

1. **Timeline**
   - Short-Term (1–3 years):
     - Develop AI governance frameworks by 2025.
     - Build national AI cloud infrastructure by 2025.
     - Train 30,000 AI professionals by 2025.
   - Mid-Term (3–5 years):
     - Ensure 50% of government services are AI-driven by 2025.
     - Increase AI adoption by 15% across sectors by 2026.
     - Establish 3 AI innovation hubs by 2027.

MODEL NATIONAL AI STRATEGY OUTLINE (3/3)

- Long-Term (5+ years):
  - Train 100,000 AI professionals by 2029.
  - Ensure 100% of government services are AI-driven by 2027.
  - Achieve 30% AI adoption across sectors by 2028.

2. Role Allocation

- Ministries: Coordinate cross-sector AI efforts, manage regulatory frameworks, and oversee AI in public services.
- Private Sector: Drive AI R&D, invest in AI startups, and collaborate in AI innovation hubs.
- Educational Institutions: Implement AI education, lead research initiatives, and support workforce development.

3. Budget Allocation

- Total Budget: Allocate $2 billion over five years for AI development, split as:
- AI R&D: $500 million for research grants and innovation centers.
- Infrastructure: $750 million for AI cloud platforms and cybersecurity.
- Skilling Programs: $500 million for training 100,000 AI professionals.
- International Collaboration: $250 million for partnerships and participation in global AI initiatives.

4. Administrative Structure

- National AI Council: Oversee strategy execution, manage inter-ministerial coordination, and provide annual progress reports.
- AI Innovation Hubs: Public-private partnerships managing R&D and industry collaboration.

For more information on building an initiative out of the National AI Strategy, please refer page 75 for detailed information

Appendix 2
Model Policy for GenAI

MODEL POLICY FOR GENAI BY POLICE AGENCIES (1/7)

A Model Policy for the use of Generative Artificial Intelligence by Police Agencies

1. Purpose

The purpose of this policy is to establish guidelines for the use of Generative Artificial Intelligence (GAI) tools, like Large Language Model artificial intelligence algorithms, within the Police Department. AI tools can have significant benefits to the department in terms of effectiveness and efficiency. However, there are also concerns surrounding this rapidly evolving technology. By issuing this policy, it is the intent of the department to ensure that AI is used responsibly, ethically, and effectively by all members of this department.

GenAI technologies are advancing at an exponential rate. Generally, the criminal justice system's policies, practices, regulations, legislation, and case law have not kept pace with AI's rapid evolution. As a result, the department is taking a responsible and measured approach to the implementation of AI. As the utility and challenges of GenAI technologies become clearer, our guidelines will undoubtedly change to clarify the authorized uses and restrictions of this powerful technology.

2. Applicability and responsibility

This policy applies to all sworn officers, civilian personnel, volunteers, and other members of the department. It is the responsibility of all department members who interact with AI technologies in the performance of their official duties to be aware of, and adhere to, the guidelines set forth in this policy.

3. Definitions

Artificial Intelligence (AI): Artificial intelligence (AI) refers to the simulation of human intelligence processes by machines, typically through the use of algorithms to automate tasks by rapidly processing and analyzing large amounts of data, and then present the results from this analysis in such a way that would typically require human intelligence.

Generative Artificial Intelligence (GenAI): This refers to a broad set of technologies that use machine learning techniques to generate content in response to user inputs. They can generate text, still images, video, speech, and music.

Large Language Models (LLM): LLMs are a subset of GAI. They are advanced natural language processing models powered by AI. They are designed to generate human-like text responses, images, speech, or music based on the input they receive.

MODEL POLICY FOR GENAI BY POLICE AGENCIES (2/7)

Text-to-Speech systems (TTS): A type of AI technology designed to transform written text into spoken language.

Voice cloning or voice synthesis systems: Programs that learn the characteristics of an individual's voice by processing audio data collected from audio samples and produce new speech that sounds exactly like their original speaker's.

Authorized user: Department members having successfully completed department authorized training in the use of GAI. These members are also referred to as “trained members.” This category also includes those who have been granted “one-time” supervisory permission to use a GenAI tool for a specific authorized purpose.

4. Applicability to personal computers or devices

All provisions of this policy shall apply to the use of personal computers or portable devices by members of this department when they are using any form of AI to complete a departmental work product or to work on any departmentally related project.

5. Responsibilities when using GenAI tools

5.1 While GenAI tools offer significant benefits, experts also recognize potential pitfalls and ethical considerations in their use. Text generating algorithms can make mistakes, embellish statements, and even fabricate “facts” in their responses. Speech generating tools can deceive people into believing a voice is the authentic voice of a person it appears to be. And image producing LLMs can generate images which appear to depict something that did not occur.

5.2 It is the responsibility of department members using GenAI tools to ensure the output or product created by the tools they are using are accurate, reliable, and consistent with the department’s ethical guidelines and legal requirements or prohibitions. In the case of image, voice or music generation, department users must also ensure the outputs are in good taste, don’t violate any of the department’s ethical guidelines or legal restrictions and are not offensive.

6. Ethical Considerations and compliance with ethical standards

6.1 For the use of AI technologies like GenAI tools in policing to be ethical, they must be used in a manner that upholds constitutional rights, protects privacy, avoids bias, ensures accuracy, and follows legal guidelines and requirements. To address these concerns, the department may employ an evaluation framework, transparent methodologies, and monitoring through both planned and random audits of AI assisted tasks to detect errors, ensure policy compliance, mitigate the potential for bias and ensure the ethical deployment of AI by members of this department.

MODEL POLICY FOR GENAI BY POLICE AGENCIES (3/7)

6.2 Department members shall not assume that outputs from GenAI tools are automatically appropriate and non-offensive to residents of diverse ethnic, racial, and gender groups. If there is the slightest reasonable concern that they may be offensive, department members should not consider using them, or, if used with supervisory approval, they should ensure they consider the impacts of any potential bias as a part of their results. Department members and supervisors shall error on the side of caution when considering this issue.

6.3 When using any AI based technology, department members shall be required to comply with all departmental ethical standards and expectations for behavior, just as they are required to follow in other areas or activities under control of the department. All other policies that provide direction for behavior and responsibilities shall be applicable in the use of AI.

7. Privacy and Data Protection

871 Without prior authorization, department personnel shall not input confidential or other law enforcement sensitive information into AGI tools without explicit prior authorization from the Chief of Police or the Chief's designee. This includes names, dates of birth, driver's license numbers, social security numbers, home addresses or other types of personally identifiable information (PII) of victims, witnesses, or suspects.

7.2 Claims that a particular AI tool is "safe and secure" for users to input any form of sensitive information shall be vetted by the department before personnel will be permitted to use the tool with sensitive departmental information or data. The approval for using an AI tool in this manner lies solely with the Chief of Police or the Chief's designee.

8. Transparency, Accountability, and the Public Trust

981 To further promote public trust and transparency of police operations, the department shall periodically convene public forums to discuss its use of technology – including the use of artificial intelligence. Concerns expressed to the department by community, government, or department stakeholders regarding the use of AI technology shall be identified and addressed as part of this disclosure.

8.2 The department shall publicly disclose the AI tools it uses, the rationale for their use, and a summary report of general findings from audits regarding the use of GenAI tools, and what if any measures were necessary to correct deficiencies.

MODEL POLICY FOR GENAI BY POLICE AGENCIES (4/7)

9. Prohibited use of LLMs

Unless they have been approved by the department, the use of LLMs to perform departmental tasks or write departmental reports is prohibited in the following instances:

There is a reasonable expectation the information contained within the report(s) or document(s) could be used in a criminal or civil proceeding.

When the report(s) or document(s) is to be presented to a prosecutor or judge for review and/or for use in a judicial procedure.

To document criminal incidents in which a suspect, victim or witness is named, identified, or there is a reasonable likelihood that he/she will be identified.

To document criminal incidents to which there are potential leads to support further investigation.

To document traffic accidents including the names and other personal identifying information of the victims, or support the issuance of a citation; and,

To document missing persons or runaway juveniles.

To document policy violations or personnel issues or evaluations.

10. Duty to Disclose

Departmental users of GenAI tools are required to disclose their use to the appropriate supervisor in the following circumstance:

The use of AI might reasonably become a contentious or debated issue.

Users have used a LLM to assist in the writing of a memorandum or report. They must disclose their use of the LLM to the supervisor(s) reviewing the report or memorandum.

When, despite departmental policy, an LLM-assisted report becomes part of a criminal or civil proceeding. Users employing the LLM to assist in the writing of the document, or any member aware of this fact, must disclose the use of the LLM to the appropriate prosecutor or the appropriate counsel representing the City in the civil action.

11. Use of GenAI tool

11.1 Prior Training Required

Only personnel who have received departmentally approved training in the use of GenAI tools are authorized to use them for departmental purposes. Exceptions to this must be approved by a supervisor or when there is a clear exigent circumstance requiring the use of the GenAI tools.

MODEL POLICY FOR GENAI BY POLICE AGENCIES (5/7)

11.2 Authorized uses of GenAI tools

The use of GenAI tools to assist in routine tasks such as writing staff reports or memorandums, general report writing, generating images, speech-to-text, etc. is authorized under the following conditions and institutionally defined as appropriate. Any other use requires the explicit approval of a supervisor or the presence of a clear exigent circumstance requiring the use of the GenAI tools.

11.2.1 Staff reports, inter and intra departmental memorandums, or community communications:

Trained users may use GenAI tools to create staff reports or memorandums to be used within the department or for communications to other City departments, or outside the department when communicating to other governmental entities or the public. Users should restrict their use to the introductory and background portions of their writings. They should themselves author the portions specific to a particular problem, issue, location, person, etc. to avoid the production of AI generated embellishments, errors, or fabrications.

Users must review the finished document for accuracy before conveying it to the intended recipient.

It is the responsibility of the user to ensure the document's approving supervisor (if there is one) is informed of the use of a LLM to assist in the writing of the document.

11.2.2 Infraction and misdemeanor reports:

Trained users may use LLMs to assist in creating certain authorized crime or incident reports, but users must review and edit the drafts to ensure accuracy and completeness. Trained users may utilize LLMs to create infraction or misdemeanor reports when the cases are:

Without named or identified suspects.

Without identifiable leads.

Without a reasonable expectation they will be used in criminal or civil proceeding; and,

It is the responsibility of the user to ensure the approving supervisor is informed of the use of a LLM to assist in the writing of the report.

11.2.3 Other crime reports:

Upon approval by the department, members may be authorized to use LLM tools to write other, more serious crime reports. This approval will be issued by the Chief of Police or the Chief's designee after an evaluation of the tool under consideration, consultation with the appropriate legal authorities and evaluation of the training needs and implications for the use of the LLM's.

MODEL POLICY FOR GENAI BY POLICE AGENCIES (6/7)

11.2.4 Complex reports

When authoring complex reports, trained users should exercise discretion when using LLMs. The more complex the issue or report, the greater the opportunities for errors. Users must carefully balance the benefit of using LLMs for these reports against their potential for error.

Supervisors must carefully review, before approving, any reports generated by LLMs for complex cases.

It is the responsibility of the user to ensure the approving supervisor is informed of the use of a LLM to assist in the writing of the report.

LLMs can assist in creating initial drafts, but users must review and edit the drafts to ensure accuracy and completeness.

12. Supervisory Responsibilities regarding the use of GenAI tools

Once a supervisor becomes aware a document or image submitted by a subordinate was AI-assisted, they are responsible for ensuring adherence to departmental GenAI policies and guidelines. Any infractions by officers of this policy should be handled in accordance with standard disciplinary procedures.

13. Handling Citizen Complaints Written with LLMs

13.1 Accepting supervisor's responsibility

a. When a supervisor accepts a citizen's complaint, they shall ask the complainant if any portion of the complaint was authored by, or with the assistance of, a LLM like ChatGPT. This includes handwritten complaints unless the individual completed the complaint in view of the supervisor. The supervisor shall explain that there is no prohibition against the individual doing so, but, because LLM are known to occasionally embellish or fabricate parts of writings, it is important to ensure the LLM did not write something the complainant did not intend to have written.

b. If the complainant indicates he/she used an LLM, the supervisor shall document that fact and forward it along with the complaint.

c. Supervisors accepting the complaint shall refrain from criticizing the complainant for his/her use of an LLM.

d. If the complainant submits an image, video, or audio recording along with the written text of the complaint, the supervisor shall follow the above steps to try and determine the specifics, accuracy, and intent of the attachment.

MODEL POLICY FOR GENAI BY POLICE AGENCIES (7/7)

Investigative responsibilities

During the initial assessment of the complaint, investigating personnel shall evaluate it to determine if it appears to have been written by using an LLM. Characteristics that should be considered are the context, wording, tone, and clarity of the complaint and/or its attachments.

When interviewing complainants, investigating personnel should ask the complainant if they used a LLM to assist in writing the complaint. If one was used, an attempt should be made to determine which parts were authored by the LLM, which by the complainant, and the accuracy of the statements created by the LLM.

Investigating personnel shall refrain from criticizing the complainant for his/her use of an LLM.

If the complainant submits an image, video, or audio recording along with the written text of the complaint, the investigating personnel should follow the above steps to try and determine the specifics, accuracy, and intent of the attachment.

14. Review and Revision

This policy will be reviewed as frequently as necessary and updated to reflect new departmental knowledge and understanding of AI, technological advancements, best practices and legislative or regulatory changes or requirements.

For more information on building an initiative out of the AI Policies and Regulations, please refer page 76 for detailed information

Appendix 3
National Initiatives

National Initiatives (17 initiatives)

#	Initiative Name	Description
1	National AI Strategy Development	Developing a comprehensive strategy to guide the adoption, development, and regulation of AI across sectors.
2	National AI Policy Development	Establishing AI-specific policies to ensure ethical, responsible, and safe AI deployment within the country.
3	National Responsible AI Framework	Creating a national framework to ensure that AI development and deployment are aligned with ethical and ethical standards.
4	AI Innovation Sandbox	Providing a testing environment where AI technologies can be safely trialed and refined with regulatory oversight.
5	AI Center of Excellence, Innovation Hub and Incubation Center	Setting up a central hub for fostering AI research, innovation, and incubation of AI startups, enabling collaboration between academia, industry, and government.
6	National AI Workbench	Establishing a collaborative platform for research, development, and innovation in AI, enabling various stakeholders to work together.
7	AI Startup Public Procurement Program	Offering opportunities for AI startups to participate in public procurement, driving innovation in public sector projects through AI solutions.
8	AI Visiting Professorship	Bringing in AI experts from around the world to collaborate with local universities and research institutions for advancing AI knowledge and innovation.
9	AI Student Exchange, Global Fellowships and Internships	Offering international exchange and fellowship opportunities to foster AI talent and global collaboration.
10	AI Curriculum and Scholarship Initiatives for Schools and Universities	Introducing AI-focused curriculums and scholarships in schools and universities to prepare students for future AI careers.
11	AI Training, Certification, and Upskilling Programs	Providing targeted AI training programs and certifications to upskill the students and create a strong AI talent pool.
12	National Data Program	Developing a national initiative to manage data governance, improve data quality, build data management and enhance accessibility through open data platforms.
13	AI Infrastructure Development and Resilience Initiative	Investing in the development of robust AI infrastructure that can support future AI advancements and withstand technological challenges.
14	AI Professional Special Talent Visa Program	Launching a visa program to attract highly skilled AI professionals and researchers to contribute to national AI development.
15	AI Startup Accelerator Program	Supporting AI startups with mentorship, funding, and resources to help them scale and succeed in competitive markets.
16	National Large Language Model (LLM) Development Program	Focusing on developing and deploying country-specific Large Language Models (LLMs) tailored to local languages and dialects. It involves collecting and curating linguistic datasets, training LLMs, and integrating them into public and private digital services
17	AI Competitions and Hackathons Initiative	The AI Competitions and Hackathons Initiative fosters innovation, collaboration, and upskilling by organizing AI-focused events in partnership with private companies and academia to address challenges across sectors like healthcare, education, and public services.

ID	N1	Name	National AI Strategy Development
Type	National	Sectors	-
Pillar	Government Strategy, Policies & Regulations	Dimension	Strategy

Objective

- To develop a comprehensive National AI Strategy that will accelerate the adoption of AI, promote innovation, align with international best practices, and address key ethical, legal, and governance challenges.

Scope and Activity

Assess current AI capabilities, engaging stakeholders, aligning with national priorities, and designing governance frameworks. Key activities involve consultations, drafting the strategy, public feedback, and sectoral alignment.

Please refer to page 9 for key activities required for development of National AI Strategy

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	2 to 3 Months	Priority	Low Medium High

Outcome

- A National AI strategy that aligns with the country's goals towards technical advancement in collaboration with public and private entities.
- Clear governance, policy and regulatory frameworks to support implementation following global standard AI guidelines.

KPIs

- AI adoption rate across sectors
- Number of AI-related partnerships and collaborations.
- User satisfaction with AI solutions implemented.
- Progress in achieving strategic AI goals.

Approach and Methodology

- Conduct a preliminary study to benchmark global AI strategies based on works from international organizations or published government reports. Provide a preliminary assessment of the country's current AI infrastructure and identify gaps in foundational areas.
- Draft National AI Strategy undertaking in-depth study of worldwide best practices and developing global AI standards.
- Review and update the National AI Strategy in comparison with framework provided in the DCO AI Adoption Playbook (Page 6). Initiate phased implementation in key sectors to test the framework and ensure early-stage alignment with national goals.
- Expand the implementation of the AI strategy in various sectors, according to needs that will evolve at the national and sectoral levels. Reinforce collaboration with the main stakeholders so that they contribute to the development of an advanced AI ecosystem that encourages further creation.
- Keep regularly updating the AI strategy by including improvement in technology and aligning it with global AI standards.

Prerequisites

- Government commitment and approval for strategy development.
- Formation of a cross-sectoral task force to lead the development along with engagement of legal and policy experts for drafting AI policies
- Involvement of public and private entities including academic sector involvement

Risk and Mitigation

Misalignment with the national strategy goal	Work closely with government agencies to integrate national goals and ensure compliance with global AI standards
No collaborative work among departments	Conduct early stakeholder workshops and ensure continuous consultation throughout the development process
Rapid AI technological changes	Build in a mechanism for continuous monitoring and updating of the strategy to reflect emerging trends and technologies

ID	N2	Name	National AI policy development
Type	National	Sectors	-
Pillar	Government Strategy, Policies & Regulations	Dimension	Policies & Regulations

Objective

- Develop and implement comprehensive AI policies and regulations that support the secure and ethical adoption of AI technologies across sectors.

Scope and Activity

The initiative involves creating and implementing a National AI policies and regulations that enable secure AI adoption. Activities include defining milestones, developing guidelines, and ensuring the continuous improvement of AI-related regulations.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome

- Government and stakeholder commitment to secure AI adoption and the development of a robust National AI Strategy.
- Collaboration with industry experts and academic institutions to ensure that AI policies are well-informed and forward-thinking.
- Continuous monitoring and improvement of the National AI Strategy.
- Alignment of AI regulations with global standards for security and ethics.

KPIs

Number of AI policies and regulations
Implementation rate of the National AI Policies and Regulations across sectors
Frequency of updates to AI policies based on feedback and technological advancements

Approach and Methodology

- Conduct baseline research to identify gaps in existing laws that may affect AI adoption and security. Assess the current state of AI within the country by organizing workshops/ meetings to raise awareness about the need for AI policies and regulations.
- Formulate initial drafts of the National AI Policies, focusing on priority areas such as data security, AI ethics, and regulatory frameworks and identify sectors that require urgent AI policies and allocate resources to begin the policy drafting process.
- Start implementing AI policies across selected sectors, such as healthcare, transportation, and finance. Set up a task force to monitor the effectiveness of the regulations and provide feedback for continuous improvement.
- Expand the National AI Strategy implementation to cover additional sectors such as education, energy, and public safety, ensuring that AI policies are enforced consistently across sectors, with regular audits and compliance checks.
- A dynamic feedback system is established to continuously revise policies based on emerging technologies, ethical concerns, and global developments. The country takes a leadership role in shaping international AI standards, working with global partners to align national policies with international norms.

Prerequisites

- Government and stakeholder commitment to secure AI adoption and the development of a robust National AI Strategy.
- Collaboration with industry experts and academic institutions to ensure that AI policies are well-informed and forward-thinking.
- Adequate funding and resources to support policy development, implementation, and monitoring efforts.

Risk and Mitigation

Resistance from Stakeholders	Engage stakeholders early in the policy development process, ensuring transparency and regular communication
Inconsistent enforcement of AI policies	Implement a monitoring and compliance system to ensure that AI regulations are uniformly enforced across sectors

ID	N3	Name	National Responsible AI Framework
Type	National	Sectors	-
Pillar	Government Strategy, Policies & Regulations	Dimension	AI Governance & Ethics

Objective

- To establish a comprehensive Responsible AI framework ensuring ethical, transparent use of AI technologies across all sectors, in line with national and international standards.

Scope and Activity

The initiative covers developing guidelines, policies, and regulations for responsible AI deployment across government, industries, and society. It will include stakeholder consultations, ethical AI governance models, and mechanisms for continuous monitoring. Key activities involve drafting legal frameworks, creating AI ethics committees, and engaging with public-private partnerships. The framework will address AI bias, transparency, and accountability.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome

- The National Responsible AI Framework will create a strong foundation for ethical AI practices, ensuring AI technologies are used responsibly and safely across all sectors.
- Improve public trust in AI, promote fairness in decision-making, and enhance compliance with privacy and data protection laws.
- Contribution to national AI leadership by aligning with global ethical AI standards and ensuring long-term sustainability in AI innovation.

KPIs

Number of sectors adopting the Responsible AI guidelines.
Number of Responsible AI training programs conducted.
Percentage of AI systems audited for fairness, transparency, and accountability.

Approach and Methodology

- Conduct consultations with key stakeholders from the government, private sector, academia, and civil society to gather input on the ethical, legal, and social concerns surrounding AI. Identify sector-specific challenges and needs, and incorporate them into the framework to ensure it is inclusive and applicable across all industries.
- Establish a National AI Ethics and Governance Committee composed of multidisciplinary experts from law, technology, and ethics. This body will oversee the framework's development, ensure compliance, and continuously update the framework to reflect evolving AI technologies and societal concerns.
- Develop a structured Responsible AI framework that includes ethical principles, governance mechanisms, compliance guidelines, and accountability measures. Key areas covered should be bias prevention, transparency, accountability, and data protection. Align the framework with international AI ethics standards (such as the OECD AI Principles) to ensure global competitiveness.
- Work closely with regulatory authorities and legal experts to integrate the framework with national laws on AI, data protection, and human rights. Conduct legal reviews to ensure the Responsible AI guidelines are enforceable and compliant with both national and international legal frameworks.
- Implement pilot programs in key sectors such as healthcare, finance, and education to test the effectiveness of the framework. Use feedback from these pilots to make iterative improvements to the framework, ensuring that it remains practical and relevant to each sector's unique challenges.

Prerequisites

- Government buy-in and policy commitment to Responsible AI.
- Comprehensive understanding of AI ethics, governance, and international standards.
- Access to public and private sector data on AI usage and applications.
- Technological infrastructure for AI auditing and monitoring.

Risk and Mitigation

Insufficient workforce skills	Provide comprehensive training programs on Responsible AI for all key sectors.
Lack of regulatory clarity	Align the framework with established international AI standards for consistency.

ID	N4	Name	AI Innovation sandbox
Type	National	Sectors	-
Pillar	Government Strategy, Policies & Regulations	Dimension	Sustainable & Inclusive AI

Objective

- To create a controlled environment where government departments can experiment, test, and develop AI-driven solutions to accelerate AI adoption and foster innovation across various sectors

Scope and Activity

The AI Innovation Sandbox will provide access to curated datasets, tools, frameworks, and cloud environments to build and test AI models. It will be accessible to multiple government departments, enabling cross-sector collaboration. The sandbox will offer real-time insights and feedback on AI solutions under development, ensuring alignment with ethical standards and regulatory compliance. It will also facilitate experimentation across different government departments and sectors.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6 Months	Priority	Low Medium High

Outcome

- Enhance innovation by providing a safe space for testing and developing AI solutions in a controlled environment.
- Faster and more cost-effective AI development by minimizing errors during the experimentation phase.
- Foster collaboration between different government entities and improve the operational efficiency of public services.

KPIs

- Number of AI projects initiated within the sandbox.
- Rate of successful transition from prototype to real-world implementation.
- Number of government departments actively using the sandbox.
- Compliance rate of sandbox-developed AI models with national AI ethics and regulatory guidelines.

Approach and Methodology

- Engage with various government departments to identify their AI development needs and set up dedicated working groups for sandbox access and feedback.
- Build a secure, cloud-based platform with access to AI tools, curated datasets, and computing resources, allowing departments to experiment safely.
- Integrate ethics guidelines and regulatory compliance checks into the sandbox environment to ensure that all AI solutions adhere to national standards.
- Start with a few pilot departments (e.g., healthcare, transport) to test the functionality and gather feedback on the platform's efficiency and adaptability.
- Continuously update and refine the sandbox environment based on user feedback, evolving technology, and regulatory changes.

Prerequisites

- A dedicated team to develop and maintain the platform infrastructure.
- Cloud computing resources to provide scalable access.
- Availability of secure and compliant datasets for experimentation.
- Clear governance and ownership structure for managing the sandbox.

Risk and Mitigation

Data Security Breaches	Implement robust encryption and access controls to prevent unauthorized access.
Technical Downtime	Regularly maintain and monitor platform infrastructure to minimize service interruptions.
Non-compliance with Regulations	Establish real-time monitoring for adherence to national and international AI standards.

ID	N5	Name	AI Center of Excellence, Innovation Hub and Incubation Center
Type	National	Sectors	-
Pillar	Technology Advancement & Readiness	Dimension	Innovation

Objective

- To create an integrated ecosystem that drives AI research, innovation, and startup growth.
- Accelerate AI adoption through collaboration and resource support.

Scope and Activity

Assess and enhance the capacity for AI innovation among the member states to allow scaling from beginner to visionary levels of AI maturity by enabling AI experiments through the centre of excellence. Activities include implementing pilot projects, scaling innovation, and ensuring continuous improvement through regular testing of new AI technologies.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome

- Increase AI innovation through experimentation.
- Adoption of AI solutions ensuring scalable implementation based on AI technologies evolving.
- Increase impact in AI leadership and contribution to international guidelines and standards.

KPIs

- Amount of funding allocated and utilized for AI experimentation and innovation initiatives
- Number of AI innovation and experimentation projects initiated
- Number of use cases for sectorial implementation
- Impact of AI projects

Approach and Methodology

- Conduct an AI assessment to identify gaps in potential areas for experimentation that leads to AI solution. Raise awareness to stakeholders about AI patent, benefits and use cases while engaging with experts to provide guidance.
- Identify priority areas for improvements that aligns with the country's national AI strategy and develop an AI roadmap to support the required innovation efforts.
- Pilot projects are implemented in prioritized areas with allocated funding and dedicated cross-functional teams of experts for guidance and support.
- Successful pilot projects are scaled, and cross-departmental collaboration is promoted to drive innovation. Develop internal centers of expertise to ensure knowledge sharing and support continuous AI experimentation.
- Establish a continuous cycle of innovation where AI projects are regularly tested, improved, and scaled. Encourage partnerships with global AI leaders, academic institutions, and international bodies to stay at the ahead in AI advancements.

Prerequisites

- Access to resources for experimentation
- Funding of AI experimentation

Risk and Mitigation

Lack of support from experts and leads for a structured team in CoE	Secure dedicated funding for establishing the CoE
Lack of legal resources for patents	Establish partnerships with legal experts

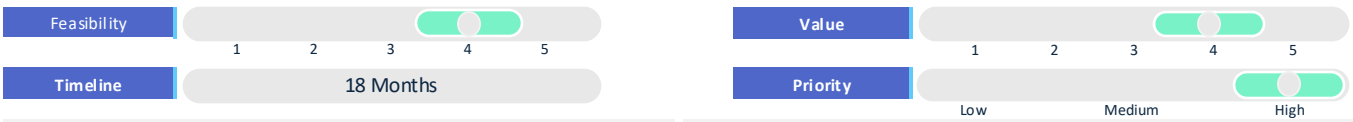
ID	N6	Name	National AI workbench
Type	National	Sectors	-
Pillar	Technology Advancements & Readiness	Dimension	Research & Development, Deployment & Integration, Innovation

Objective

- Build a centralized platform for governments to foster collaborative AI research, development, and innovation across multiple sectors, accelerating the development of AI-driven solutions.

Scope and Activity

The National AI Workbench will provide a unified platform for AI-related activities across all government sectors. It will support the development of AI models, facilitate data exchange between departments, and promote the sharing of research findings and innovations. Departments will collaborate on joint initiatives like predictive analytics, automation, and policy planning, while maintaining data security and regulatory compliance. The platform will also offer tools and resources for AI experimentation, model training, and innovation acceleration.



Outcome

- Enhance collaboration between ministries, fostering a culture of joint problem-solving through AI.
- Optimized policy planning, enhanced public service delivery, and more efficient government operations.
- Departments will experience faster AI model development cycles, leading to cost savings and improved accuracy in decision-making.
- Promote the creation of a robust AI ecosystem within the government that drives continuous innovation.

KPIs

- Number of cross-departmental AI projects initiated and completed.
- Number of sandbox tested AI initiatives converted to full-scale AI model deployments
- Percentage reduction in data silos by measuring the rate of cross-departmental data sharing.

Approach and Methodology

- Begin by engaging with government ministries to understand their AI requirements, including the types of data they manage and their most pressing use cases. This process will help shape the AI workbench's objectives and ensure it aligns with the goals of cross-departmental collaboration. The data catalogue will play a central role here, acting as a repository of standardized, discoverable datasets that ministries can leverage for AI projects.
- Design a flexible and modular AI platform that integrates with the government's existing data catalogue, enabling seamless access to diverse datasets. The workbench should support multiple AI tools for model development, data analysis, and real-time collaboration. Robust infrastructure, either cloud-based or on-premise, will be essential to ensure scalable compute power and data security across departments.
- Establish governance protocols to standardize data quality, ensure compliance with privacy laws, and enforce access controls. This connection will allow ministries to utilize shared datasets for collaborative AI projects while maintaining data ownership and security.
- Launch pilot projects that leveraging the AI workbench and gather feedback from these pilots to enhance platform features and the integration with the data catalogue, ensuring smoother workflows and better outcomes.
- Train government staff on how to use the workbench effectively. Ensure employees can navigate the catalogue, access datasets, and develop AI models. Once the platform proves successful in pilot programs, expand its usage across all ministries and departments, leveraging the shared data and AI tools to foster continuous collaboration and innovation.

Prerequisites

- High-performance infrastructure for processing large datasets and training AI models.
- A centralized AI governance framework to manage compliance, ethics, and data security.
- Skilled personnel across ministries capable of engaging in AI development.
- Budget allocations and funding for initial platform development, maintenance, and pilot projects.

Risk and Mitigation

Data privacy violations	Implement strict access controls, encryption, role-based permissions, and regular security audits to ensure data protection.
Lack of quality data	Establish clear data governance frameworks with guidelines on data collection, cleaning, and validation, ensuring consistent data quality and integrity.
Resistance to Adoption by Ministries	Provide ongoing training, clear communication of benefits, and incentives for collaboration to encourage platform adoption and active usage.

ID	N7	Name	AI Startups Public Procurement Program
Type	National	Sectors	-
Pillar	Impact of AI on the Economy	Dimension	Public - Private Partnerships / AI Growth & Innovation

Objective

- Enable startups to participate in AI-related public procurement.
- Improve government services using AI solutions from startups.
- Help startups grow by giving them access to government contracts.

Scope and Activity

This initiative focuses on making public procurement easier for startups working on AI technologies. It helps startups collaborate with the government to provide AI solutions for public sector needs. The program includes training, networking, and support to guide startups through the procurement process.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6 – 12 Months	Priority	Low Medium High

Outcome

- The initiative will increase startups' participation in government contracts, driving AI innovation in public services.
- It will enhance the efficiency and quality of government operations by integrating advanced AI solutions. Startups will benefit from new business opportunities, funding, and exposure.
- The program will foster a stronger AI ecosystem, contributing to national economic growth and technological advancement.

KPIs

Number of startups participating in public procurement
Improvement in government service efficiency
Total funding allocated to startups through the program
Increase in startup growth and revenue through government contracts

Approach and Methodology

- Conduct an assessment to explore the potential of AI in public procurement, identifying challenges and opportunities for startups interested in AI solutions.
- Develop a foundational AI implementation strategy by reviewing successful pilot projects and engaging stakeholders to align with national objectives.
- Launch small-scale AI pilot projects within the public procurement framework, focusing on specific areas for innovation. Collect data to refine implementations.
- Broaden the initiative to include a wider range of startups and AI solutions, fostering collaboration between government agencies and startups for scalable applications.
- Regularly evaluate and update the strategy by integrating new AI advancements and lessons learned, ensuring alignment with national priorities and global best practices.

Prerequisites

- Startups should be legally registered and have a proven ability to deliver AI solutions.
- Only startups offering AI technologies or services can apply.
- Startups must demonstrate that their AI solutions align with public sector needs and government innovation goals.

Risk and Mitigation

Limited startup participation	Actively promote the program through workshops, webinars, and outreach efforts to inform and attract startups. Provide incentives or support to encourage participation.
Quality of AI solutions	Establish a rigorous evaluation process for assessing the quality and feasibility of AI solutions before awarding contracts.
Compliance and regulatory challenges	Offer guidance and resources to help startups navigate public procurement regulations and compliance requirements. Provide training sessions on procurement processes to ensure startups are well-informed.

ID	N8	Name	AI Visiting Professorship
Type	National	Sectors	-
Pillar	Talent and Skill	Dimension	AI Education & Training Programs

Objective

- Engage top AI researchers from other nations or institutions to form partnerships and collaborations
- Boost the AI research ecosystem
- Connect top AI talents with top companies

Scope and Activity

This initiative consists of preparing programs that aim to attract distinguished AI researchers who would be participating in the AI talents development at universities.
Also, it covers connecting public and private companies with the AI qualified talents. Hence, companies are enriched with the best talents in the market, and AI jobseekers get the opportunity to find jobs in the AI sector and join leading companies.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome

- Group of AI visiting professors
- Talent pool of researchers within universities
- Outstanding AI talents for companies
- Employment opportunities for top AI employees

KPIs

Number of participating universities
Number of AI visiting professors
Number of participating companies
Number of recruited AI talents
Number of AI students at universities supervised by visiting professors

Approach and Methodology

- Conduct initial assessments to specify: universities having AI programs, universities having potential to welcome AI visiting professors, companies having AI talent needs, number of AI talents searching for AI jobs.
- Engage one university having AI curriculum in a pilot program engaging few visiting professors from foreign institutions or organizations. Involve one company having AI talents in a specific sector to formalize the talent exchange program.
- Engage multiple universities in AI programs with visiting professors from national and foreign institutions and organization. Initiate the talent exchange program with selected companies in multiple sectors.
- All universities receive visiting professors from national and foreign institutions and organization. The talent exchange program involved all companies with AI talent needs in all focus sectors.
- These globally recognized programs are continuously monitored with feedback mechanisms to assess impact and improve outcomes based on experiences of participant universities, companies, institutions and organization.

Prerequisites

- Availability of AI curriculum at universities
- List of companies with current and future need for AI talents

Risk and Mitigation

Insufficient funds	Prepare a funding policy for this initiative involving the government, public sector and universities
Availability of visiting professor	Specify the percentage amount of time that the visiting professor should be available with his students
Commitment of universities	Set a policy for universities who join the visiting professorship program
Unequal opportunities	Set a policy for the talent exchange program to streamline the talent acquisition

ID	N9	Name	AI Student Exchange, Global Fellowships and Internships
Type	National	Sectors	-
Pillar	Talent and Skill	Dimension	AI Education & Training Programs/International Collaboration

Objective

- Connect local AI talent with global research and innovation networks.
- Enhance AI skills through fellowships, exposing talent to cutting-edge projects.
- Strengthen the national AI ecosystem by integrating global best practices.

Scope and Activity

The initiative focuses on creating a platform for AI professionals to participate in international talent exchange programs and fellowships. It connects local AI researchers, developers, and experts with global institutions, encouraging cross-border knowledge sharing and skill development. The program includes structured fellowships, collaborative research opportunities, and practical projects in various sectors. Participants will gain exposure to advanced AI technologies and return with insights to apply within their home country, fostering a stronger AI innovation ecosystem.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 – 18 Months	Priority	Low Medium High

Outcome

- Enhanced national AI expertise through global knowledge transfer and innovation.
- Stronger international partnerships driving ongoing collaboration in AI.
- Boost in local AI projects and workforce capabilities, contributing to economic growth.

KPIs

- Tracks the number of AI professionals involved in the program
- Measures how many participants implement gained expertise locally
- Monitors the creation of international collaborations through the program
- Assesses the impact of the program on local AI innovation and development

Approach and Methodology

- Conduct initial assessments to explore how AI can benefit public procurement. Identify potential opportunities for startups to engage in government projects.
- Initiate small-scale pilot projects, allowing startups to showcase their AI solutions in targeted public procurement efforts. Begin formalizing guidelines for startup participation
- Integrate AI-driven solutions from startups into government processes more consistently, using insights from pilot projects. Expand participation across more sectors.
- Establish a structured AI procurement framework, aligning startup-driven AI solutions with national goals. Collaboration between startups and government entities becomes routine.
- AI becomes a core element of public procurement strategy. Startups consistently drive innovation, and their AI solutions significantly transform public sector operations. Continuous improvements and global standards are regularly incorporated.

Prerequisites

- The government should provide resources, such as training programs and platforms, to help startups navigate the procurement process and develop scalable AI solutions.
- A framework should facilitate international mobility, including visa support and cross-border collaboration processes.

Risk and Mitigation

Talent Retention Challenges	Create attractive incentive packages and career development opportunities to retain talent within the program.
Cultural and Communication Barriers	Implement cross-cultural training and mentoring programs to facilitate smoother interactions and integration among diverse participants.
Limited Participation from Global Talent	Actively promote the program through targeted marketing campaigns and partnerships with international universities and organizations to attract diverse participants.

ID	N10	Name	AI Curriculum and Scholarship Initiatives for Schools and Universities
Type	National	Sectors	-
Pillar	Talent and Skill	Dimension	AI Education and Training Programs

Objective

- Introduce education in AI to create a future-ready workforce
- Provide scholarships to ensure that AI education reaches students from various socio-economic backgrounds.

Scope and Activity

The National AI Curriculum and Scholarship Programs initiative aims to integrate AI education into the school and university system, equipping students with foundational AI knowledge and skills to prepare them for future careers in AI and related fields. The initiative focuses on curriculum development, teacher training, and creating a pipeline of talent through scholarships, targeting high school students and university undergraduates. This national initiative is aligned with the broader goal of building a sustainable AI talent pool to support the country's AI-driven economy.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome

- Increased AI literacy: A generation of students proficient in AI, equipped with skills to enter AI-related careers.
- AI-driven innovation: Graduates contributing to AI advancements in various sectors, fostering national AI leadership.
- Inclusive AI ecosystem: A diverse AI talent pool contributing to reducing socio-economic disparities in the tech industry.

KPIs

- Number of schools and universities that have adopted the AI curriculum.
- Number of students receiving AI-related scholarships annually, with focus on socio-economic diversity.
- Number of students enrolled in AI courses and participating in AI extracurricular activities.
- Percentage of students successfully completing AI programs in schools and universities.

Approach and Methodology

- Conduct a baseline assessment of current AI awareness in schools and universities. Begin pilot programs introducing AI concepts through guest lectures or workshops.
- Develop structured AI curriculum frameworks for different education levels, partnering with educational boards and local institutions to ensure alignment with national education standards.
- Expand the AI curriculum across a broader range of schools and universities, formalizing AI as part of STEM education. Launchscholarship programs targeting high-potential students for AI-related degrees.
- Implement national assessment standards to measure the impact of the AI curriculum and scholarship programs. Use data to track student progress and refine the program based on outcomes.
- Scale the curriculum to all educational institutions nationwide, continuously updating AI content to keep pace with technological advancements. Expand scholarship programs to include internships and research grants in collaboration with industry leaders.

Prerequisites

- National guidelines supporting AI education in schools and universities.
- Allocation of financial resources for curriculum development, teacher training, scholarships, and AI labs.
- Establishment of digital infrastructure in schools and universities, including AI labs and cloud-based learning platforms.

Risk and Mitigation

Resistance to curriculum changes	Early stakeholder engagement with educational institutions and policymakers to ensure smooth integration.
Lack of qualified AI teachers	Develop teacher training programs and certifications in collaboration with AI experts and industry partners.
Digital divide and resource limitations in rural areas	Provide remote learning options, access to AI resources through cloud platforms, and offer scholarships and grants for rural schools.

ID	N11	Name	AI Training, Certification, and Upskilling Programs
Type	National	Sectors	-
Pillar	Talent and Skill	Dimension	Continuous Learning & Skill Development

Objective

- Ensure that AI education is available for people of different backgrounds and in multiple areas
- Provide upskilling AI opportunities that help people advance in their careers

Scope and Activity

The scope of this initiative consists of preparing AI skilling programs endorsed by the government aiming to help people join the AI jobs and workforce. Also, it entails promoting basic AI literacy through planning and providing AI courses, trainings and workshops to cover all regions and be accessible by all socioeconomic levels.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6 Months	Priority	Low Medium High

Outcome

- Free AI trainings, courses and workshops
- AI certifications
- AI upskilling programs
- New AI career paths for current workforce

KPIs

Number of free trainings, courses, workshops, upskilling programs
Number of participants in trainings, courses, workshops, upskilling programs
Number of regions and areas covered / uncovered by the programs
Number of people switching to AI career paths due to upskilling programs

Approach and Methodology

- Conduct initial assessment to specify the available AI training programs that can be endorsed by the government, identify thedifferent groups and regions that would be involved in he training programs, and classify the workforce that potentially would be involved in theupskilling programs.
- Start with a pilot AI training program in one region, and with a pilot workforce category participating in an official AI skil certification program endorsed by the government.
- Initiate more training and courses covering more regions, engage more workforce categories in AI upskilling courses, and endorse more AI skill certification programs by the government.
- Expand the AI training programs to cover all regions and groups, exhaustive AI skill certification programs endorsed by the government are available for all workforce categories.
- These recognized programs and certifications are continuously monitored with feedback mechanisms to assess impact and improveoutcomes based on experiences of attendees.

Prerequisites

- Provided training centers and platforms by the government
- Collaboration between government and companies to align on workforce upskilling needs
- Availability of AI instructors

Risk and Mitigation

Insufficient funds	Prepare a funding policy for this initiative by the government
Unequal opportunities	Set a plan to prepare all regions to incorporate this initiative
AI certifications recognition	Get AI certifications recognized at local and foreign level

ID	N12	Name	National Data Program
Type	National	Sectors	-
Pillar	Data & Infrastructure	Dimension	Data Availability, Management, & Quality

Objective
- Enhancing national data quality
- Accelerating data exchange
- Establishing comprehensive and efficient national data management and governance

Scope and Activity
National data program will encompass establishment of a centralized but decoupled data repository supported by a National Reference Data Repository, an implemented National Data Quality Management Framework, established National Open Data Platform, governed by National Data Management and Governance Policy.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome
- National-scale homogenous and standardized central data repository
- Secure, standardized, and scalable data exchange
- Defined metadata that promotes data discovery
- Availability of reliable and uniform reference data
- Readily available non-confidential open data to foster innovation

KPIs

Percentage of Government Agencies Complying with Data Management Policy
Percentage of Open Datasets Available
Data Accuracy Rate
Stakeholder Engagement Rate

Approach and Methodology

- Establish a foundational framework with government-backed initiatives. Assess the existing data ecosystem including key datasets, data repositories, data exchange, data quality, data management, reference data initiatives and policies
- Refine program objectives to enhance data accessibility, data management, governance and data infrastructure. Expand access to specialized technology infrastructure, define standardized data policies
- Scale the program by offering more funding, mentorship, and access to advanced and specialized technology infrastructure. Collaborate across various industries and sectors for wider adoption of the program. Develop reusable data assets that can be cross leveraged across sectors
- Implement data exchange framework and an open data platform enabled by data quality, management and governance policies across sector. Develop fully integrated, policy enabled data management systems to support seamless AI deployment, with real-time updates, governance, and automation
- Promote the adoption of data quality and governance process that are periodically updated, to ensure the highest consistency across all sources and departments

Prerequisites
- Availability of technology infrastructure, software and skills to implement the platform
- Establishment of APIs and interoperability standards
- Cross sector collaboration and data sharing policy

Risk and Mitigation

Insufficient collaboration	Establish clear communication, responsibility and governance frameworks from participating entities could lead to limit availability of data assets and underutilization of the platform
Resistance to adopt	Develop a change management strategy that includes continuous stakeholder engagement, training, and support

ID	N13	Name	AI Infrastructure Development and Resilience Initiative
Type	National	Sectors	-
Pillar	Technology Advancements & Readiness, Data & Infrastructure	Dimension	Infrastructure, Data Management & Protection

Objective

- Strengthen AI infrastructure to enhance system reliability and performance.
- Provide technical support to organizations in adopting AI technologies.
- Foster collaboration between public and private sectors for AI resilience.

Scope and Activity

The initiative focuses on enhancing AI infrastructure to ensure robust and resilient systems that can withstand disruptions. It aims to support organizations in implementing AI technologies through training, technical assistance, and resource allocation. Collaboration between government and industry stakeholders is vital for sharing knowledge and best practices in AI resilience. The initiative will address critical infrastructure needs by promoting research and development of AI solutions tailored to local challenges.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6-12 Months	Priority	Low Medium High

Outcome

- Enhanced infrastructure leads to faster processing speeds and increased reliability of AI systems, resulting in better overall performance and user experience.
- Streamlined processes and upgraded infrastructure reduce operational costs and time, enabling more efficient use of resources across AI initiatives.
- Improved infrastructure provides enhanced security measures, reducing vulnerabilities and protecting sensitive data involved in AI operations.

KPIs

- Number of AI infrastructure projects implemented
- Research collaborations established
- Rate of adoption of AI tools and platforms
- User satisfaction rate with AI infrastructure

Approach and Methodology

- Organizations recognize the importance of infrastructure for AI but have yet to invest in upgrades or strategic planning.
- Organizations begin assessing their current infrastructure capabilities, identifying key areas for improvement related to AI performance.
- Basic infrastructure enhancements are implemented, focusing on optimizing existing resources to support AI initiatives and applications better.
- A comprehensive infrastructure strategy is developed, integrating advanced technologies that significantly enhance AI system resilience and performance across various applications.
- AI infrastructure is a core innovation, and integration of cutting-edge AI technologies to drive the competitive component of the organization's strategic vision, enabling seamless scalability, and advantage. Continuous improvement and adaptation to emerging technologies are prioritized.

Prerequisites

- Advanced IT infrastructure with cloud and edge computing capabilities to support AI workloads.
- Data management systems that ensure the availability of high-quality, structured data for AI training and deployment.
- Cybersecurity protocols in place to safeguard AI systems from potential threats and vulnerabilities.

Risk and Mitigation

Insufficient infrastructure scalability	Invest in flexible, scalable cloud-based infrastructure to handle growing AI demands.
Data security breaches	Implement robust cybersecurity measures, including encryption and regular system audits.
Implementation costs	Prioritize phased investments and explore public-private partnerships to share costs and resources.

ID	N14	Name	AI Professional Special Talent Visa Program
Type	National	Sectors	-
Pillar	Talent and Skill	Dimension	AI Education and Training Program

Objective

- Attract top AI talent from around the world to enhance local expertise.
- Streamline the visa application process for skilled AI professionals.
- Foster innovation and collaboration within the AI sector by increasing the talent pool.

Scope and Activity

The AI Professional Special Visa Program aims to create a simplified pathway for skilled AI professionals to work in the country. It focuses on providing quick visa processing times and reducing bureaucratic hurdles. The program will target professionals with expertise in key AI areas, such as machine learning, data science, and robotics. Additionally, it will promote partnerships between local companies and international talent to encourage knowledge exchange.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6 Months	Priority	Low Medium High

Outcome

- Attract a diverse range of skilled AI professionals to enhance the local workforce.
- Strengthen the country's position as a leading hub for AI research and development.
- Facilitate sharing of best practices and advanced techniques from international experts to local teams.
- Contribute to job creation and economic expansion through the establishment of new AI ventures and collaborations.

KPIs

Number of Visas issued
Time taken for visa processing
Retention rate of AI talent
Number of Partnerships Created

Approach and Methodology

- Review current immigration frameworks to identify areas that need adjustment for the introduction of the AI-specific visa program.
- Set clear goals for the program, such as attracting experts in AI fields like machine learning and robotics and specify eligibility criteria.
- Establish the necessary legal and regulatory structures to support the visa program, ensuring compliance with national laws.
- Collaborate with local industries and international stakeholders to promote knowledge exchange and facilitate the smooth integration of AI professionals.
- Implement the program, monitor its effectiveness through KPIs, and make adjustments based on performance and feedback from participating professionals and companies.

Prerequisites

- Clear, streamlined policies that facilitate the introduction and management of the visa program.
- Sufficient financial resources to support program operations, outreach, and talent recruitment.
- Established legal guidelines to ensure compliance with national labor laws and protect both the AI professionals and the hiring entities.

Risk and Mitigation

Talent Shortage	Promote the program through global outreach and partnerships with international universities and tech organizations to attract diverse talent
Regulatory Compliance Issues	Provide clear guidelines and support for applicants to navigate visa requirements
Integration Challenges	Implement mentorship programs to help international talent acclimate to the local work culture

ID	N15	Name	AI Startup Accelerator Programs
Type	National	Sectors	-
Pillar	Impact of AI on Economy	Dimension	Entrepreneurship

Objective

- Support early-stage AI startups by providing mentorship, resources, and networking opportunities to accelerate their growth.

Scope and Activity

The program will identify high-potential AI startups and offer them access to government-backed resources such as expert mentorship, technical infrastructure, and funding to accelerate their growth. It will focus on nurturing startups across key sectors such as healthcare, agriculture, energy, and public services. The accelerator will also provide networking opportunities with investors, corporates, and government bodies to facilitate commercialization and market expansion.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 Months	Priority	Low Medium High

Outcome

- Strengthen the national AI ecosystem by producing scalable AI solutions that contribute to national growth.
- Participating startups will become key players in AI innovation, creating new jobs and contributing to the country's digital transformation.
- Well structured and defined framework in place for startup founders to accelerate the growth of their business
- Increased research and development and growth of innovation in AI

KPIs

Number of AI startups enrolled in the program
Percentage of startups that remain operational after the program
Number of AI products developed and successfully launched
Number of jobs created due to new AI startups

Approach and Methodology

- Establish a foundational framework with government-backed initiatives. Assess the startup ecosystem, identify barriers, and set up funding mechanisms, public-private partnerships, and access to data and infrastructure for AI development.
- Refine program objectives to align with national AI strategy. Expand outreach, build partnerships with universities, and attract more AI-focused startups.
- Scale the program by offering more funding, mentorship, and access to advanced technology. Collaborate with global tech hubs, provide international exposure, and ensure legal and regulatory frameworks support AI startups.
- Develop specialized tracks for key industries. Create incentives for startups in critical sectors, attract international startups, and ensure startups have access to essential datasets and advanced infrastructure.
- Promote the country as a global AI startup hub. Encourage cross-border collaborations, attract investment, offer ongoing support for AI ethics and legal frameworks, and provide post-acceleration support to ensure startup sustainability

Prerequisites

- Access to a network of industry experts, investors, and mentors.
- Budget to fund and support AI Startups
- Governing body to select and monitor the government supported startups

Risk and Mitigation

Failure of startups to scale or succeed post-accelerator.	Provide post-program support such as access to ongoing mentorship, funding opportunities, and government contracts to ensure sustained growth.
Regulatory Challenges	Ensure an agile and transparent regulatory framework for AI startups, with clear guidelines for data use, ethics, and innovation in AI.

ID	N16	Name	National Large Language Model (LLM) Development Program
Type	National	Sectors	-
Pillar	Technology Readiness and Advancement	Dimension	Innovation

Objective

- To create and implement country-specific Large Language Models (LLMs) that promote digital transformation, enhance local language processing capabilities, and support diverse linguistic communities in digital and AI-driven services.

Scope and Activity

This initiative focuses on developing and deploying country-specific Large Language Models (LLMs) tailored to local languages and dialects. It involves collecting and curating linguistic datasets, training LLMs, and integrating them into public and private digital services, including sectors like healthcare, education, and governance. Continuous feedback and improvement will ensure the models remain relevant and effective.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6 Months	Priority	Low Medium High

Outcome

- Localized AI solutions will improve access to digital services in native languages, boosting digital literacy and engagement.
- Drive innovation in the local AI ecosystem by supporting startups and academic research in natural language processing, creating jobs and stimulating economic growth.
- Public sector services, such as healthcare, legal aid, and education, will benefit from more accurate and efficient language models, enhancing service delivery.

KPIs

- Number of LLMs developed for local languages.
- Accuracy and relevance scores of LLMs in real-world applications.
- Percentage of digital public services enhanced by LLM integration.
- Growth in NLP-related startups and academic research outputs.
- User satisfaction rates with AI-driven services in native languages.

Approach and Methodology

- Conduct a comprehensive analysis of the country's linguistic landscape, identifying major languages, dialects, and key sectors (e.g., healthcare, education, government) that would benefit from LLM integration.
- Gather and curate large datasets from public and private sources, ensuring high-quality linguistic data for local languages and dialects, focusing on diverse domains such as legal, healthcare, and education.
- Develop and train Large Language Models (LLMs) using the collected data, fine-tuning the models for specific domains to ensure they meet the accuracy and relevance required for public sector applications.
- Implement the developed LLMs into digital platforms across various sectors, integrating them into public services like healthcare chatbots, virtual assistants, and educational tools to enhance user experiences.
- Collect user feedback and performance data to iteratively improve the LLMs, expanding the models to cover additional languages, dialects, and domains, while refining accuracy and efficiency based on real-world use cases.

Prerequisites

- High-performance computing resources for training and deploying large language models.
- A workforce of AI researchers, linguists, and engineers capable of developing and fine-tuning LLMs.
- Clear legal and ethical guidelines for data collection, usage, and privacy protection.

Risk and Mitigation

Lack of Comprehensive Data for Minor Languages.	Engage local communities and institutions to co-create datasets and fill language gaps.
High Computational Costs	Partner with cloud service providers or use distributed training to reduce infrastructure costs.
Model Biases in Language Interpretation.	Regularly audit models for bias and ensure diverse datasets during training to mitigate inaccuracies.

ID	N17	Name	AI Competitions and Hackathons Initiative
Type	National	Sectors	
Pillar	Talent and Skill	Dimension	Continuous Learning & Skill Development

Objective

- To foster innovation, upskill the workforce, and promote collaboration by organizing AI-focused competitions and hackathons in partnership with private sector companies and academic institutions.

Scope and Activity

Designing and conducting AI competitions and hackathons to address pressing challenges in various domains such as healthcare, agriculture, education, and public services. Engage with industry experts and academics to define challenge themes that can be solved using AI. Partner with tech companies for tools, sponsorships, and mentorship. Provide participants access to resources like datasets, APIs, and training sessions. Host events that encourage problem-solving and showcase solutions to potential adopters.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	3 Months	Priority	Low Medium High

Outcome

- Development of innovative AI solutions for national challenges.
- Creation of a talent pipeline skilled in AI technologies.
- Strengthened collaboration between government, academia, and industry.
- Increased public awareness and interest in AI technologies.

KPIs

- Number of AI competitions and hackathons conducted.
- Number of solutions or prototypes developed and implemented.
- Percentage of participants receiving internships or funding opportunities.
- Growth in partnerships with private sector and academic institutions.

Approach and Methodology

- Organize small-scale local hackathons to introduce AI concepts, focusing on simple challenges in domains like education and public services. Partner with universities and local experts to provide basic tools, curated datasets, and introductory training sessions, building foundational knowledge and interest.
- Expand to regional competitions addressing specific challenges in sectors like healthcare and agriculture. Collaborate with tech companies to define challenge themes, offer datasets, APIs, and sponsorships, and engage industry experts for mentorship and preparatory workshops to improve participant outcomes.
- Launch national-level hackathons targeting pressing national challenges, such as improving public services with AI solutions. Partner with government agencies, tech leaders, and academic institutions to provide resources and mentorship, and incentivize participation with funding, internships, and incubation opportunities for winning solutions.
- Institutionalize annual AI competitions with a focus on innovative solutions for high-impact domains like healthcare and education. Integrate hackathons with national innovation ecosystems, offering access to government-backed funds, accelerator programs, and industry partnerships to scale successful solutions.
- Position the country as a global leader by hosting international AI hackathons and summits addressing global challenges, such as climate change or sustainable agriculture. Partner with multinational organizations for broader reach, showcase solutions globally, and attract international investments and collaborations to further the AI ecosystem.

Prerequisites

- Collaboration agreements with academic and private sector partners.
- Availability of high-quality datasets and technical resources for participants.
- Funding and sponsorships for event organization and prizes.

Risk and Mitigation

Limited Access to High-Quality Datasets or Tools	Partner with tech companies and data providers to offer relevant datasets, APIs, and tools. Engage public agencies to share anonymized and domain-specific datasets.
Bias in AI Solutions Due to Poor Dataset Diversity	Ensure datasets used in competitions are diverse and representative. Conduct pre-event reviews of datasets to eliminate potential biases and inaccuracies.
Lack of High-Quality Solutions	Provide pre-event training sessions, workshops, and access to mentorship to upskill participants and guide them toward impactful solutions.

Appendix 4
Sectoral Initiatives

Sectoral Initiatives (9 sectors, 24 initiatives)

#	Sector	Initiative Name	Description
1	Healthcare	AI-Assisted Medical Diagnosis and Treatment Planning	Utilizing AI to assist doctors by analyzing medical images (e.g., X-rays) to detect diseases and generate personalized treatment plans.
2		AI for Disease Outbreak Prediction and Health Monitoring	Leveraging AI to predict potential disease outbreaks and monitor health conditions in remote areas for timely interventions.
3	Public Services	AI-Driven Social Data Analysis for Informed Policy-Making across Sectors	Using AI to analyze social data to help governments and organizations make policies and refine them across various sectors.
4		AI-Powered Emergency Response and Disaster Management System	Implementing AI technologies to improve emergency response and disaster management by predicting and responding to critical events efficiently.
5		AI-Enhanced Digital Government Services and Automation	Automating public services through AI-driven chatbots, virtual assistants, and other tools to improve the efficiency of government operations.
6		Water Resources Management Using AI	Optimizes water distribution, monitors quality, and predicts demand by leveraging AI and IoT technologies to enhance sustainability and efficiency in water resource utilization.
7	Education	AI-Powered Workforce Reskilling and Upskilling Programs	Offering AI-based training programs to help workers reskill and upskill, ensuring they remain competitive in the evolving job market.
8		AI-Driven Educational Platform for Student and Teacher Support	Providing an AI-powered platform that supports students and teachers by managing attendance, grading, and career guidance.
9	Energy	AI-Driven Energy Monitoring and Optimization for Municipal Infrastructure	Using AI and IoT networks to monitor and optimize energy consumption in public infrastructure, leading to cost savings and improved efficiency.
10		AI for Renewable Energy Integration in Smart Grids	Leveraging AI to efficiently integrate renewable energy sources into smart grids, improving energy distribution and sustainability.
11		AI-Powered Energy Consumption Forecasting	Using AI to accurately forecast energy consumption patterns, helping optimize usage and reduce costs across sectors.

Sectoral Initiatives

#	Sector	Initiative Name	Description
12	**Transportation**	AI for Urban Public Transport Optimization and Passenger Management	Implementing AI to optimize urban public transport networks, manage passenger counts, and improve travel routes and efficiency.
13		AI-Driven Road Accident Forecasting and Infrastructure Planning	Utilizing AI to predict road accidents and assist in planning safer, more efficient transportation infrastructure.
14		AI for Passenger and Cargo Demand Forecasting, Optimization, and Management	Applying AI to forecast, optimize, and manage passenger and cargo demands in transportation, ensuring better resource allocation and efficiency.
15	**Agriculture**	AI-Based Early Detection, Monitoring, and Prediction of Crop Diseases	Using AI to monitor, detect, and predict crop diseases early, reducing losses and improving agricultural productivity.
16		AI-Powered Precision Farming	Leveraging AI technologies for precision farming to optimize crop yield and resource usage.
17		AI-Powered Real-Time Climate Monitoring	Implementing AI to monitor climate conditions in real-time, providing data for environmental protection and disaster preparedness.
18	**Security**	AI-Driven Biometric Identification Systems	Using AI for biometric identification (e.g., facial recognition, fingerprint analysis) while ensuring compliance with privacy regulations.
19		AI-Powered Cybersecurity Threat Detection and Automated Response	Utilizing AI to detect cybersecurity threats and automatically respond to mitigate risks and secure systems.
20		AI-Driven Public Safety and Emergency Response System	Employing AI technologies to enhance public safety and streamline emergency response operations for better crisis management.
21		Threat Detection and Risk Assessment Initiative	Leveraging AI to analyze patterns and intelligence data, enabling proactive identification, prediction, and mitigation of security threats across critical domains.

Sectoral Initiatives

#	Sector	Initiative Name	Description
22	**Oil & Gas**	AI-Based Price Forecasting and Action Recommendations for Global Markets	Leveraging AI to forecast prices based on global market data and provide actionable recommendations on purchasing decisions.
23	**Tourism**	AI Concierge for Personalized Travel Recommendations	Using AI to offer personalized travel recommendations and itineraries for users based on their preferences and past behavior.
24		AI-Powered Real-Time Language Translation for International Travelers	Providing real-time AI-driven language translation services to assist international travelers in overcoming language barriers.

4.1 Healthcare

ID	S1	Name	AI-Assisted Medical Diagnosis and Treatment Planning
Type	Sectoral	Sector	Healthcare

Objective

- To enable the Ministry of Health to improve healthcare by deploying AI for analyzing complex data and enhancing diagnostic and treatment processes.

Scope and Activity

The focus of this initiative is developing an AI system for analyzing healthcare data, particularly medical imaging like X-rays. The system will be trained on large datasets from public healthcare institutions, ensuring it is tailored to local medical needs and practices following ethical guidelines and regulations. AI will support doctors by reducing diagnostic errors, speeding up decision-making, and offering evidence-based treatment suggestions, allowing doctors to focus on complex cases and patient interaction.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 – 24 Months	Priority	Low Medium High

Outcome

- Improved diagnostic accuracy and faster treatment planning, supporting doctors in making informed decisions
- Improve access to advanced healthcare technologies in underserved regions, contributing to better overall public health and optimized resource utilization across the healthcare sector
- Early detection will help prevent disease progression, improve patient outcomes, and reduce treatment costs

KPIs

Percentage increase in diagnostic accuracy, measured by comparing AI-assisted diagnosis with traditional methods.
Reduction in Diagnostic Time
Doctor satisfaction rate
Percentage increase in earlier disease detection

Approach and Methodology

- Develop initial AI models using open-source data, conduct basic validation, and gather feedback from doctors to identify key diagnostic use cases. Launch small-scale pilots in select hospitals to test basic AI capabilities in X-ray analysis.
- Expand pilot projects to multiple hospitals, integrating AI with Electronic Health Records (EHR). Use real-time hospital data to enhance AI performance, refine diagnostic accuracy, and begin training a small group of doctors to use the system effectively.
- Improve AI by incorporating complex data such as patient histories and lab results. Refine diagnostic precision and introduce personalized treatment recommendations. Train more healthcare professionals on the use of AI for both diagnosis and treatment planning.
- Deploy AI systems nationwide across hospitals and clinics, fully integrating with EHRs. Ensure compliance with data privacy regulations, monitor AI performance in real time, and continuously update the system based on user feedback and clinical outcomes.
- Achieve full AI maturity where the system provides near-autonomous support for early disease detection, diagnostics, and personalized treatment plans. AI learns from ongoing data to offer predictive insights, allowing doctors to focus on complex cases while AI manages routine diagnostics, optimizing healthcare delivery.

Prerequisites

- Access to large, high-quality medical imaging datasets for AI training.
- Robust IT infrastructure for data storage, processing, and EHR integration.
- Regulatory compliance and data privacy protection.
- Training programs for healthcare professionals on AI use.
- Pilot testing and continuous validation in clinical settings.

Risk and Mitigation

Diagnostic inaccuracies	Continuous validation and real-time feedback loops to improve AI model accuracy.
Resistance from healthcare staff	Provide comprehensive training and involve clinicians in system development to ensure usability.
System integration challenges	Conduct thorough testing and phased rollouts to ensure seamless integration with existing healthcare systems.
Algorithm bias	Use diverse datasets and regularly audit AI models to reduce bias in diagnoses and treatment recommendations.

ID	S2	Name	AI for Disease Outbreak Prediction and Health Monitoring
Type	Sectoral	Sectors	Healthcare

Objective

- Use AI to analyze health data and predict disease outbreaks in remote areas.
- Improve early detection and response to health conditions in underserved regions.

Scope and Activity

This initiative leverages AI to collect and analyze data from various sources, such as health reports, environmental data, and population trends, to predict potential disease outbreaks. By using machine learning algorithms, the system identifies patterns and flags emerging health risks. The initiative also aims to improve communication with local healthcare providers, ensuring timely intervention in remote areas. AI tools will be tailored to specific regional needs, optimizing prediction accuracy.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 – 24 Months	Priority	Low Medium High

Outcome

- Improved early detection of disease outbreaks in remote areas, leading to faster intervention.
- Enhanced healthcare resource allocation based on accurate AI-driven predictions.
- Reduction in disease spread and improved overall health outcomes in underserved regions.

KPIs

- Accuracy in disease outbreak predictions
- Coverage of remote areas analyzed by AI
- Improvement in health outcomes in remote areas
- Decrease in disease spread rate

Approach and Methodology

- Exploring AI to understand its potential for disease prediction but lacking formal strategies or systems in place for its implementation in healthcare
- Initiating pilot projects that apply AI for health monitoring in select remote regions, with basic data collection and analysis capabilities.
- Implementing AI systems across multiple regions, integrating AI-driven disease prediction models into existing healthcare processes and decision-making frameworks.
- Establishing a formal strategy for widespread AI deployment, with robust, real-time data streams from remote areas and seamless integration of AI predictions into public health policies and response protocols.
- AI is a critical tool in national healthcare strategies, driving early interventions and healthcare resource optimization. AI systems continuously evolve, with predictive accuracy refined and consistently improving healthcare outcomes in remote areas.

Prerequisites

- Reliable and diverse health data from remote areas must be collected, processed, and accessible for AI training and analysis.
- Robust digital connectivity and infrastructure are needed to enable real-time data transmission.
- Partnerships with local healthcare providers and organizations to ensure accurate data collection and effective implementation of insights

Risk and Mitigation

Insufficient or inaccurate data	Establish rigorous data collection protocols and collaborate with local health agencies to ensure the quality and accuracy of health data.
Limited infrastructure in remote areas	Invest in satellite or mobile technologies to improve digital connectivity and infrastructure in underdeveloped regions.
Resistance from local healthcare providers	Conduct awareness and training programs to demonstrate the benefits of AI tools, promoting collaboration and trust in AI-driven healthcare solutions.

4.2 Public Services

ID	S3	Name	AI-Enhanced Digital Government Services and Automation
Type	Sectoral	Sectors	Public Services

Objective

- Transform public service delivery by leveraging AI technologies such as chatbots, AI assistants, and automation tools, enhancing service efficiency, citizen engagement, and satisfaction

Scope and Activity

This initiative will focus on automating key public service functions, such as customer support, service delivery, and customer engagement, through AI-driven solutions. Such as, implementing AI assistant chatbots to handle inquiries, automating public service workflows (form submissions, and service tracking), integrating AI technologies to provide personalized and efficient services, reducing wait times and administrative tasks.

Outcome

- Accelerating delivery of public services with AI automation, leading to faster processing time and higher customer satisfaction
- Availability of AI-powered services, improving accessibility and trust in government services
- Reducing operational costs by automating processes allowing resources to focus on higher-value tasks

KPIs

Reduce processing time of routine services
Increase customer satisfaction
Number of automated services implemented and in operation
Saving cost by automating processes and reduce reliance on manual work

Approach and Methodology

- Conduct an assessment of the most frequent public service inquiries and tasks that could be automated and initiate engagement with government key stakeholders to identify potential AI use cases for service automation.
- Initial implementation of small-scale automation through AI assistants and chatbots for specific tasks, such as responding to FAQs.
- Pilot programs for AI-driven services are expanded, and structured processes are in place to test AI tools for more complex service automation. Public-private collaborations become more formalized, focusing on scaling successful pilot projects.
- Full-scale implementation of AI solutions across public services, AI assistants will handle a broader range of requests, while automated workflows manage entire service processes. Formal partnerships with private tech providers are secured for long-term support.
- AI is Fully integrated into public services, with dedicated resources and continuous feedback mechanisms to refine and enhance AI capabilities. Long-term strategic investments in AI will ensure scalability, and public-private partnerships will focus on future innovations and impact.

Prerequisites

- Early engagement of key stakeholders from the public sector and leaders in AI
- Ensure strong technology infrastructure, including cloud-based platforms, to support AI-driven automation
- Provide training programs to upskill employees and raise AI awareness campaigns for the public

Risk and Mitigation

Data privacy concerns	Implement strong data protection policies and ensure AI solutions comply with privacy regulations
Lack of trust in AI services	Raise awareness through campaigns to build trust in the system
Employees resistance to automation	Provide upskilling programs and training for employees

ID	S4	Name	AI-Driven Social Data Analysis for Informed Policy-Making across Sectors
Type	Sectoral	Sectors	Public Services

Objective

- Enhance AI to analyze social data and provide insights for evidence-based policy decisions across various sectors.

Scope and Activity

This initiative focuses on using AI to process vast amounts of social data from diverse sources. It aims to provide real-time insights for policymakers to make informed decisions. The analysis covers sectors such as healthcare, education, and public safety. By identifying trends and patterns, it supports targeted and effective policy interventions. This will improve public service delivery and resource allocation across different sectors.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 – 24 Months	Priority	Low Medium High

Outcome

- Increase in policy adjustments based on insights from AI-analyzed social data, improving responsiveness to societal needs.
- Reduction in response time for addressing public concerns by leveraging real-time data analysis.
- Enhanced effectiveness of social programs through data-driven strategies that better target key issues across sectors.

KPIs

- Accuracy of AI-generated insights for policy recommendations
- Reduction in policy decision-making time through AI analysis.
- Percentage of policies influenced by AI-driven data insights.
- Coverage of sectors utilizing AI for social data analysis.

Approach and Methodology

- Gather vast amounts of social data from various platforms and sources, integrating it into a centralized system for analysis.
- Use AI models to process, analyze, and detect trends, patterns, and emerging issues across sectors in real-time.
- Extract actionable insights from the analyzed data, identifying key areas for policy intervention and improvement.
- Align the insights with current sectoral policies, ensuring that data-driven decisions are incorporated into policy adjustments.
- Regularly monitor the effectiveness of policy changes and use AI tools for ongoing analysis and refinement of strategies.

Prerequisites

- Ensure access to relevant social data sources, while complying with data privacy and security regulations.
- Establish a robust AI infrastructure with sufficient processing power and storage capacity to handle large datasets.
- Set up partnerships between policy-makers, data scientists, and sectoral experts to effectively interpret and apply AI-driven insights.

Risk and Mitigation

Data Privacy Violations	Implement strict data encryption and anonymization protocols.
Biased Data Insights	Regularly audit AI models and diversify data sources to reduce bias.
Inaccurate Predictions	Continuously update models with real-time data and improve accuracy through iterative testing.

ID	S5	Name	AI-Powered Emergency Response and Disaster Management System
Type	Sectoral	Sectors	Public Services

Objective

- Develop an AI-driven system that enhances emergency response and disaster management capabilities, allowing for real-time decision-making and faster response times during crises.

Scope and Activity

This initiative focuses using AI to analyze real-time data to monitor and predict events, and optimizing the allocation of emergency services and resources based on need and risk. Activities will include developing AI solution in collaboration with public safety agencies and emergency response units to integrate the solution with standard protocols

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 – 24 Months	Priority	Low Medium High

Outcome

- Optimized resource allocation and real-time data analysis leading to quicker and more effective disaster responses.
- Develop and implement AI models predicting disasters with greater precision, minimizing loss of life and damage.
- The AI system is adaptable across regions and disaster types, ensuring wide applicability and continuous improvement.

KPIs

Accuracy of disaster predictions
Reduction in policy decision-making time through AI analysis.
Feedback from emergency response units and public safety agencies
Resource allocation efficiency, ensuring direction to areas in need

Approach and Methodology

- Initial research focusing on gathering historical data on past disasters and evaluating the current emergency response procedures through engagement with emergency services to identify key areas where AI can enhance disaster management
- Piloting the solution for specific types of disasters (e.g., floods, wildfires) while the AI models are trained on limited datasets to predict events and suggest resource allocation strategies. Initiating partnerships with emergency services to test initial use cases and gather feedback
- The functionality of the solution expands to handling broader range of disasters. AI models are refined for greater accuracy, and the system begins optimizing the coordination of multiple response units
- Implementation of the AI solution across national emergency services, Real-time data feeds are integrated to continuously update predictions and resource allocation plans. The solution is used to manage complex disaster scenarios, and partnerships with multiple agencies ensure smooth operations
- The AI solution is fully integrated into the disaster management system with continuous learning from events, ensuring accuracy and effectiveness of results. Public-private partnerships support ongoing innovation and scalability, with AI tools adapting to evolving risks and response needs

Prerequisites

- Ensure access to data from various sources (ex. Sensors, social media, meteorological data) for accurate predictions
- Strong AI infrastructure to develop a scalable solution for processing large real-time data for decision making
- Collaboration with emergency services

Risk and Mitigation

Inaccurate predictions	Continuously update and refine AI models using real-time data and historical patterns.
Resistance to adopt AI solution	Provide thorough training and showcase success stories to demonstrate the benefits of AI-driven response systems

ID	S6	Name	Water Resources Management Using AI
Type	Sectoral	Sectors	Public Services

Objective

- To optimize the use and management of water resources by leveraging AI for predicting water demand and supply, and improving the efficiency of water distribution systems.

Scope and Activity

Using AI for water resources management to ensure sustainability and equitable distribution. Developing AI models to analyze historical and real-time data from water sources, weather conditions, and consumption patterns. Deploying predictive analytics to forecast water demand, identify potential shortages, and optimize water allocation across regions. Utilizing AI-driven systems to detect leaks, monitor water quality, and improve operational efficiency in water distribution networks.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	6 Months	Priority	Low Medium High

Outcome

- Improved efficiency in water distribution systems, reducing wastage and operational costs.
- Enhanced water quality monitoring, ensuring public health and compliance with environmental standards.
- Accurate demand and supply forecasts, enabling proactive measures to prevent water scarcity.
- Increased sustainability of water resources through optimized allocation and usage.

KPIs

- Reduction in water wastage due to leak detection and optimized distribution.
- Percentage improvement in water demand forecast accuracy
- Number of regions with equitable water allocation based on AI predictions
- Reduction in operational costs for water distribution networks.

Approach and Methodology

- Begin by collecting and analyzing basic historical data on water consumption, rainfall, and reservoir levels to identify baseline patterns. Deploy simple AI models to test basic water demand forecasting and detect inefficiencies in small pilot areas.
- Expand data integration to include real-time monitoring through IoT-enabled sensors placed in reservoirs, pipelines, and treatment plants. Implement AI models to identify and predict potential water shortages, leaks, and distribution inefficiencies, focusing on limited regions.
- Integrate AI-powered water management systems into municipal and regional water distribution networks to optimize resource allocation. Provide training programs for water management authorities to effectively use AI tools and interpret actionable insights.
- predictive AI analytics to enable dynamic, real-time water allocation and quality monitoring across all national water systems. Collaborate with industry and research institutions to incorporate cutting-edge technologies like digital twins for water resource optimization.
- Establish a nationwide AI-driven system for water management, including forecasting demand, improving quality, and automating responses to crises. Leverage global partnerships to adopt best practices, share data, and position the country as a leader in sustainable water management technologies.

Prerequisites

- Access to historical and real-time data on water sources, consumption, and environmental conditions.
- Robust IT infrastructure for data processing and AI model deployment.
- Collaboration agreements with municipalities and environmental agencies.

Risk and Mitigation

Data Gaps in Historical Record	Collaborate with agencies to fill data gaps using interpolation or modeling techniques.
System Integration Challenges	Test AI solutions for compatibility with legacy water management systems before full deployment.
Algorithm Bias in Resource Allocation	Ensure datasets are diverse and representative of all regions and user groups.

4.3 Education

ID	S7	Name	AI-Driven Educational Platform for Student and Teacher Support
Type	Sectoral	Sectors	Education

Objective

- To develop and implement a digital platform that streamlines educational processes improving the overall efficiency of academic sector and enhancing the student-teacher experience.

Scope and Activity

This initiative will focus on building a user-friendly platform that automates attendance records and reporting for students, digital grading for teachers, career guidance tools to efficiently manage and analyze student performance. To ensure that the platform meets academic standards and requirements, collaborating with educational institutions should be considered.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 – 18 Months	Priority	Low Medium High

Outcome

- Increase efficiency by automating attendance and grading reducing administrative tasks for teachers focusing on learning
- Access to real-time data improving interaction between student and teachers enabling timely feedback on performance
- Personalized tools to guide students and support in career decisions improving post graduation success

KPIs

- Percentage of schools successfully onboarded onto the platform
- Number of students using the platform
- Feedback score from students and teachers regarding platform usability

Approach and Methodology

- Conduct as assessment to identify areas where automation can be implemented and engage stakeholders such as, teachers and school administrators.
- Initial platform features, such as digital attendance and grading systems, are implemented for select classes and partnerships with technology providers will guide the development of core features, and feedback will be gathered to refine the platform.
- The platform's functionality is expanding with advanced grading systems, attendance tracking across multiple grades, and basic career support services for students. Partnership with educational institutions and tech companies is finalized to support in the platform rollout.
- Full-scale implementation of the platform across schools, offering comprehensive features; detailed grading analytics, attendance tracking, and personalized career support for students.
- Platform is fully integrated into educational processes, offering seamless management of students, with continuous improvements through feedback from students and teachers.

Prerequisites

- Engage with teachers, students, administrators, and parents early in the process to ensure the platform meets their needs
- Ensure availability of the necessary devices and internet access to support platform adoption at education centers
- Provide accessible training for teachers and administrators on how to use the platform effectively

Risk and Mitigation

Resistance from teachers	Provide comprehensive training and ongoing support for teachers to ease the transition
Data privacy	Implement strict data protection policies and ensure compliance with relevant privacy regulations
Technical issues disrupting learning	Ensure technical support and regular platform maintenance to prevent or quickly resolve issues

ID	S8	Name	AI-Powered Workforce Reskilling and Upskilling Programs
Type	Sectoral	Sectors	Education

Objective
- Equip the workforce with the latest skills required for AI-driven and tech-focused roles, ensuring employees remain competitive in a rapidly evolving job market.

Scope and Activity
Design and implement an AI-powered platform that assesses current skills, recommends personalized learning pathways, and provides tailored training resources. The platform will target employees across industries, focusing on emerging skills in AI, data analysis, digital literacy, and more.

Feasibility

Value

Timeline: 12 – 18 Months

Priority

Outcome
- Increased workforce adaptability to new roles and emerging industry needs.
- Enhanced employee skillsets in high-demand areas, leading to career growth and job security.
- Improved productivity and innovation across participating companies due to an upskilled workforce.

KPIs

Percentage of employees completing assigned upskilling programs.
Measured increase in target skills through pre- and post-training assessments.
Satisfaction levels with training, assessed via post-program surveys.

Approach and Methodology
- Conduct baseline assessments to identify skill gaps and priority training areas.
- Develop the AI-driven platform with personalized learning paths, interactive modules, and performance tracking.
- Curate training resources with input from industry experts to ensure alignment with current job market demands.
- Provide employees with resources to navigate the platform, including orientation and support.
- Track program effectiveness, gather feedback, and continuously refine learning modules based on evolving industry trends.

Prerequisites
- Reliable data on current workforce competencies to drive customized learning recommendations.
- Active involvement of employers to ensure alignment with industry skill requirements.
- Sufficient digital infrastructure to support online training and interactive learning components.

Risk and Mitigation

Content Relevance	Establish a regular review cycle with industry partners to update content based on market demand.
Motivation Challenges	Introduce incentives such as certifications, rewards for completion, and career progression opportunities tied to skill advancement.
Technical Implementation Issues	Perform pre-launch testing, provide reliable tech support, and schedule regular maintenance to minimize disruptions.

4.4 Energy

ID	S9	Name	AI for Renewable Energy Integration in Smart Grids
Type	Sectoral	Sectors	Energy

Objective

- Use AI to optimize renewable energy integration into smart grids.
- Improve grid stability through AI-driven demand and supply predictions.
- Reduce energy waste and costs.

Scope and Activity

This initiative uses AI to improve the integration of renewable energy into smart grids. AI will optimize energy distribution and balance supply and demand in real-time. It aims to enhance grid reliability while reducing energy loss and costs. The program supports a sustainable energy infrastructure and scalable AI solutions for future needs.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	24-30 Months	Priority	Low Medium High

Outcome

- Enhanced integration of renewable energy sources, leading to a more sustainable energy grid.
- Improved grid reliability and stability, resulting in fewer power outages.
- Increased efficiency in energy management, reducing operational costs for utility providers.
- Significant reduction in carbon emissions, contributing to national and global climate goals.

KPIs

Percentage of renewable energy successfully integrated into the smart grid.
Carbon emissions decrease due to optimized energy distribution, measured in tons.
Reduction in grid downtime due to AI-predicted maintenance,
Accuracy of AI forecasts for energy demand and supply

Approach and Methodology

- Organizations are exploring AI technologies and their potential applications in smart grid management, but they lack a formal strategy for integrating renewable energy.
- Initial pilot projects using AI for renewable energy integration are underway. Organizations are beginning to gather data and insights to inform future decisions about AI implementation.
- Organizations have integrated AI tools into their processes for managing renewable energy in smart grids, leading to improved operational efficiency.
- A comprehensive AI strategy aligns renewable energy initiatives with organizational goals, embedding AI technologies across various processes to enhance smart grid operations.
- AI management of renewable energy is central to the business strategy, fostering continuous innovation and significant advancements in energy integration and sustainability.

Prerequisites

- Conduct a thorough evaluation of existing grid infrastructure to identify integration capabilities
- Protocols for data formats and communication between systems.
- Compile a list of available renewable energy resources for integration.

Risk and Mitigation

Data Security Breaches	Implement robust cybersecurity measures and regular audits.
Grid Instability	Use advanced forecasting algorithms to predict demand and adjust supply accordingly.
Regulatory Compliance Issues	Stay updated on regulations and collaborate with legal experts for compliance guidance.

ID	S10	Name	AI-Driven Energy Monitoring and Optimization for Municipal Infrastructure
Type	Sectoral	Sectors	Energy

Objective
- Improve energy efficiency in municipal facilities.
- Lower energy costs for city services.
- Optimize use of renewable energy sources in infrastructure.

Scope and Activity
Aims to implement AI-driven solutions to monitor energy consumption across municipal infrastructure. The project will identify inefficiencies and recommend optimization strategies by analyzing real-time data. It will focus on various city facilities, including schools, parks, and public buildings. The initiative also seeks to enhance the integration of renewable energy sources into municipal operations. Ultimately, it will provide actionable insights to reduce energy costs and support sustainability goals.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 - 24 Months	Priority	Low Medium High

Outcome
- Enhanced Energy Efficiency: Achieve significant reductions in energy consumption across municipal facilities through real-time monitoring and optimization.
- Increase the adoption of renewable energy sources in municipal infrastructure to support sustainability initiatives.
- Generate substantial savings in energy-related expenses, allowing for reinvestment into community programs and infrastructure improvements.

KPIs

Percent decrease in energy usage.
Total savings in energy expenses.
Percent of energy from renewables.
Percent increase in system efficiency.

Approach and Methodology
- Implement IoT sensors and data collection systems across municipal infrastructure to gather real-time energy consumption data.
- Utilize AI algorithms to analyze the collected data for patterns, inefficiencies, and potential optimizations in energy usage.
- Continuously monitor energy performance metrics, adjusting AI models as necessary to reflect changing conditions and operational goals.
- Generate reports and dashboards that provide actionable insights for municipal managers, highlighting areas for improvement and optimization strategies.
- Collaborate with relevant stakeholders to implement recommended changes, such as energy-efficient technologies and policy adjustments, to enhance overall energy performance.

Prerequisites
- Evaluation of existing municipal energy systems to identify areas for improvement and optimization.
- Secure and scalable data management system to collect, store, and analyze energy usage data effectively..

Risk and Mitigation

Inaccurate Data Analysis	Implement continuous monitoring and validation processes for data accuracy to ensure reliable energy usage insights.
System Downtime:	Establish a backup system and routine maintenance schedule to minimize disruptions in energy monitoring and optimization.
Compliance Issues	Regularly review and update protocols to ensure adherence to local energy regulations and standards.

ID	S11	Name	AI-Powered Energy Consumption Forecasting
Type	Sectoral	Sectors	Energy

Objective

- Implement AI-powered systems to forecast national energy consumption trends, enabling more efficient energy distribution, reducing wastage, and supporting sustainable energy planning

Scope and Activity

The initiative will involve the collection and analysis of historical energy consumption data from various government building across the country. AI models will be developed to predict future energy requirements to support the Ministry of Energy in making informed decisions regarding energy production, distribution, and sustainable energy investments. The system will be continuously updated to improve prediction accuracy and respond to changing conditions.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 - 18 Months	Priority	Low Medium High

Outcome

- AI-powered energy forecasting will lead to more accurate predictions of national energy needs, minimizing energy wastage and improving resource allocation.
- Enhance the Ministry of Energy's ability to integrate renewable energy sources into the grid and optimize the overall energy supply chain.
- The forecasting tool will aid in meeting climate change commitments by supporting the shift toward greener energy options.

KPIs

- Forecast accuracy of energy consumption over different time horizons
- Percentage reduction in energy wastage
- Percentage reduction in energy distribution costs through optimized load management.

Approach and Methodology

- Gather historical data on energy consumption from multiple sources, including power plants, utilities, and smart meters. Ensure data diversity across sectors, regions, and timespans.
- Develop and train machine learning models using data on weather patterns, population trends, and economic indicators to predict future energy demand across various sectors.
- Test the AI models using historical data to ensure accurate and reliable predictions. Refine models based on real-world deviations.
- Implement the AI model into the national energy grid's monitoring systems to provide real-time energy demand forecasts.
- Set up feedback loops where new data continually improves the AI models, ensuring adaptability to changing energy consumption patterns and emerging trends.

Prerequisites

- Availability of clean and comprehensive energy consumption data.
- Infrastructure for data storage, processing, and management at a national scale.
- Skilled workforce with expertise in AI, data science, and energy sector dynamics.
- Regulatory framework for the integration of AI in energy management.

Risk and Mitigation

Model bias	Use diverse datasets to train models and avoid over-reliance on historical patterns.
Model Drift Due to Changing Consumption Patterns	Implement regular model retraining schedules and establish monitoring systems to detect and adjust for model drift in real time.
Insufficient Historical Data	Address data gaps by collaborating with multiple energy stakeholders and using data augmentation techniques, such as simulation-based modeling.

4.5 Transportation

ID	S12	Name	AI for Urban Public Transport Optimization and Passenger Management
Type	Sectoral	Sectors	Transportation

Objective

- Optimize route planning by using AI to adjust schedules based on passenger demand patterns.
- Enhance passenger flow to reduce congestion during peak hours.

Scope and Activity

The initiative aims to optimize urban public transport networks by utilizing AI to enhance route efficiency and reduce congestion. It will involve real-time data analysis to manage passenger flow and adjust schedules dynamically. The project focuses on improving vehicle availability through predictive maintenance and optimizing fleet utilization. This will enhance overall service quality, reduce delays, and improve the commuter experience.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12-18 Months	Priority	Low Medium High

Outcome

- Enhanced efficiency in public transport operations and scheduling.
- Improved passenger flow with reduced overcrowding and wait times.
- Optimized resource allocation, leading to cost savings and better service coverage.

KPIs

- Reduction in average passenger wait time
- Increase in on-time bus/train arrivals
- Decrease in operational costs
- Improvement in passenger satisfaction ratings

Approach and Methodology

- Collect real-time data from various sources, including passenger counts, traffic conditions, and transit schedules, to understand current patterns.
- Develop AI models to simulate different scenarios, predict peak traffic times, and optimize routes based on passenger flow and demand.
- Adjust public transport schedules, allocate resources, and optimize routes to reduce congestion and improve efficiency based on AI insights.
- Regularly monitor performance metrics, gather feedback, and refine the system to ensure ongoing improvements in passenger flow and network optimization.

Prerequisites

- Reliable systems for collecting real-time transit and traffic data.
- Access to AI modeling and simulation technologies.
- Coordination between transport authorities and city planners.

Risk and Mitigation

Insufficient Infrastructure for Increased Demand	Assess infrastructure to identify bottlenecks and prioritize upgrades for increased passenger capacity.
System Integration Challenges	Establish a phased integration plan with regular testing to ensure compatibility of new technologies with existing systems.
Inaccurate Data Collection for Traffic Patterns	Implement advanced data analytics tools and IoT devices to ensure accurate and real-time collection of traffic and passenger flow data for informed decision-making.

ID	S13	Name	AI for Passenger and Cargo Demand Forecasting, Optimization, and Management
Type	Sectoral	Sectors	Transportation

Objective

- Implement AI-powered solutions that accurately forecast passenger and cargo demand, optimize transportation resources, and improve overall management of logistics

Scope and Activity

This initiative will forecast passenger and cargo demand based on historical data and seasonal trends, as well as optimizing the use of transportation resources (vehicles, staff). Activities to achieve this initiative is developing AI algorithms to improve forecasting accuracy and partnering with logistics companies and transport operators to integrate AI solutions

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 – 18 Months	Priority	Low Medium High

Outcome

- Optimize use of transportation resources reduces costs and improves overall efficiency
- Accurate forecasting enhances on-time performance, leading to higher customer satisfaction
- Optimize use of transportation resources reduces costs and improves overall efficiency

KPIs

- Number of transport operators adopting AI-driven solutions
- Increase customer satisfaction
- Reduce operational costs
- Accuracy of forecast

Approach and Methodology

- Conduct research to identify key variables affecting demand fluctuations and begin initial data collection by engaging with transport operators and explore potential use cases for AI forecasting and optimization
- Basic AI forecasting models are implemented to predict general demand trends, predictions on a small-scale prediction testing, focusing on optimizing specific routes or cargo shipments
- AI tools expanded offering more accurate and granular predictions, considering factors like seasonal special events. Formalizing collaborations with transport operators for more structured testing of AI-based optimization for scheduling and cargo management
- AI implementation across multiple transport networks for both passenger and cargo services with real-time optimization to adjust transport resources based on changing demand
- AI is fully integrated into transportation operations, providing continuous forecasting and optimization.

Prerequisites

- Access to historical passenger and cargo data, external factors (e.g., weather, traffic patterns) to train AI models
- Involvement of transport operators, logistics companies, and local authorities to implement AI-driven forecasting and optimization
- Capable AI platforms for processing large datasets in real time for forecasting

Risk and Mitigation

Inaccurate forecasting	Continuously refine AI models using real-time data and integrate multiple data sources for improved accuracy
Resistance from operators	Offer training and support for operators to effectively adopt AI tools and demonstrate potential cost savings
Data security concerns	Secure handling of transportation data through advanced encryption with data privacy regulations

ID	S14	Name	AI-Driven Road Accident Forecasting and Infrastructure Planning
Type	Sectoral	Sectors	Transportation

Objective

- Predict road accident hotspots using AI.
- Optimize infrastructure planning based on risk data.
- Enhance road safety through proactive measures.

Scope and Activity

This initiative focuses on using AI to analyze traffic data and forecast potential road accidents. It aims to identify high-risk areas and provide insights for infrastructure improvements. By leveraging predictive models, it will support smarter planning of road networks and safety measures. The initiative also intends to reduce accident rates through early risk detection. Ultimately, it seeks to enhance public safety and optimize resource allocation for road infrastructure.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 – 24 Months	Priority	Low Medium High

Outcome

- Enhanced road safety through proactive accident prevention.
- Data-driven infrastructure planning optimized for high-risk areas.
- Improved efficiency in emergency response systems.
- Reduced accident rates and improved traffic flow in targeted zones.

KPIs

- Reduction in road accidents in identified high-risk areas.
- Accuracy of AI-driven accident forecasts.
- Percentage of infrastructure improvements based on AI insights.
- Decrease in emergency response times in high-risk zones.

Approach and Methodology

- Compile extensive real-time and historical datasets, including traffic volume, accident records, road conditions, weather, and infrastructure details to ensure comprehensive analysis.
- Design and train AI algorithms to process the collected data, identifying patterns, correlations, and potential accident hots pots based on various factors such as time of day, weather, and traffic density.
- Collaborate with urban planners to integrate AI-generated insights into road and infrastructure designs, prioritizing upgrades in high-risk zones and enhancing traffic flow management.
- Implement AI-driven monitoring systems to continuously track road conditions, providing predictive alerts to drivers and authorities on potential accident risks and traffic disruptions.
- Regularly update and fine-tune the AI models using new data inputs, enhancing accuracy in forecasting accidents and making iterative improvements to infrastructure planning.

Prerequisites

- Ensure the availability of historical and real-time data from traffic management systems, accident reports, and weather databases.
- Establish the necessary computational resources and AI tools for processing large datasets and running predictive models efficiently.
- Secure partnerships with local governments and transportation departments to align AI insights with infrastructure development plans.

Risk and Mitigation

Traffic Data Gaps	Establish partnerships with local authorities and IoT providers to gather comprehensive real-time traffic data.
Infrastructure Overload	Prioritize infrastructure improvements based on risk levels and ensure a phased implementation aligned with AI insights.
Weather and Environmental Factors	Integrate real-time weather data into AI models to adjust forecasts and refine infrastructure planning dynamically.

4.6 Agriculture

ID	S15	Name	AI-Based Early Detection, Monitoring, and Prediction of Crop Diseases
Type	Sectoral	Sectors	Agriculture

Objective

- Deploy an AI-powered platform for early detection, monitoring, and prediction of crop diseases to help reduce agricultural losses, improving crop yield, food security

Scope and Activity

The initiative will focus on developing and deploying AI systems that detect, monitor, and predict crop diseases across agricultural regions, ensuring timely interventions. It will integrate real-time data from multiple sources, such as imagery and weather patterns, to provide early warnings. The system will also support farmers by delivering actionable insights on disease prevention and resource optimization. Nationwide implementation will follow, with regular updates and monitoring to ensure system effectiveness in reducing agricultural losses.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 – 24 Months	Priority	Low Medium High

Outcome

- Improved crop productivity while significantly reducing resource waste, particularly water and fertilizers.
- More efficient farm management practices by providing real-time actionable insights for farmers.
- Significant contribution to sustainable agriculture by optimizing resource consumption and minimizing the environmental footprint.
- Farmers will benefit from better planning and higher predictability in crop cycles, leading to reduced losses.

KPIs

- Percentage of crop diseases detected correctly by the AI system compared to traditional methods.
- Percentage decrease in crop losses year on year due to early disease detection and intervention.
- Reduction in the time taken to identify crop diseases using AI compared to manual inspections.

Outcome

- Reduced crop losses through early detection and intervention, preventing widespread disease outbreaks.
- Improved crop yields due to timely monitoring and effective disease management.
- Optimized resource use, including pesticides and water, reducing waste and lowering costs.
- Increased agricultural sustainability through proactive disease management and environmental conservation.
- Broader adoption of AI technology among farmers, driving digital transformation in agriculture.

Approach and Methodology

- Begin gathering data from sensors, satellite imagery, and historical crop records. Perform exploratory analysis to identify early disease patterns and evaluate the feasibility of AI-powered predictions.
- Develop initial AI models for disease prediction using the collected data, then conduct small-scale pilot tests in select regions. Refine models based on feedback and early results.
- Integrate AI systems with real-time data from weather stations and field sensors. Implement continuous learning, expanding pilot testing to various regions and crop types to improve model accuracy.
- Deploy the AI system nationwide, providing training programs to farmers and field experts to ensure effective adoption and usage of the AI platform for disease detection.
- Transition the AI system to autonomous monitoring, enabling real-time crop health tracking. Use continuous feedback loops to optimize and update the AI models, ensuring reliability and adaptability.

Prerequisites

- Sufficient datasets, including weather patterns, soil health, and historical crop disease data, are needed to train AI models.
- Reliable internet connectivity, cloud-based data storage, and computing resources are required to support real-time data processing and AI deployment.

Risk and Mitigation

Data privacy concerns	Implement strong encryption and data governance protocols to protect sensitive agricultural data.
Low adoption by farmers	Conduct extensive outreach and training programs to ensure farmers understand the benefits and usage of AI tools.

ID	S16	Name	AI-Powered Precision Farming
Type	Sectoral	Sectors	Agriculture

Objective

- Leverage AI technologies to enhance precision farming, optimizing crop yield and resource usage through data-driven insights and automated decision-making.

Scope and Activity

Utilizing AI-driven tools such as computer vision, machine learning, and IoT sensors to monitor soil conditions, predict weather patterns, and provide real-time recommendations for water and nutrient management. The initiative covers the integration of AI-based platforms with existing farming infrastructure and training farmers on using these tools. Additionally, AI models will help forecast demand, enabling better planning for harvesting and resource allocation.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12-18 Months	Priority	Low Medium High

Outcome

- Improved crop productivity while significantly reducing resource waste, particularly water and fertilizers.
- More efficient farm management practices by providing real-time actionable insights for farmers.
- Significant contribution to sustainable agriculture by optimizing resource consumption and minimizing the environmental footprint.
- Farmers will benefit from better planning and higher predictability in crop cycles, leading to reduced losses.

KPIs

- Increase in crop yield per hectare.
- Reduction in water usage per crop cycle.
- Accuracy of predictive models in weather and soil condition forecasting.
- Cost savings in resource (water, fertilizer) usage per season.

Approach and Methodology

- Deploy a network of IoT sensors, drones, and satellite technology across selected farms to gather comprehensive data real time on soil conditions, moisture levels, temperature, and crop health. Develop and train machine learning algorithms using historical and real-time agricultural data to predict optimal farming practices. These AI models will be fine-tuned to accommodate different crops, soil types, and environmental conditions. The algorithms will be designed to generate actionable insights for irrigation scheduling, fertilization, pest management, and yield prediction.
- Organize comprehensive training programs, workshops, and digital tutorials to ensure farmers are comfortable with AI-driven tools. Support networks, including helplines and local field experts, will be established to provide ongoing assistance.
- Implement the precision farming system in a controlled pilot phase in diverse agricultural regions to validate the AI models and sensor networks. The data from this pilot will be analyzed to refine the AI algorithms and determine the best strategies for large-scale deployment. Regular feedback from farmers will be collected to assess the usability of the system and make adjustments as needed.
- Once validated, the initiative will be scaled across different regions, with a focus on expanding to various crop types and climatic zones

Prerequisites

- Availability of IoT infrastructure for data collection in the field.
- Access to historical and real-time weather and soil data.
- High-quality, reliable internet connectivity in rural farming areas to support real-time data transfer and AI tool usage.

Risk and Mitigation

Data privacy and security concerns.	Implement robust data protection policies and secure data storage solutions.
High cost of initial AI setup and IoT sensors	Explore government subsidies, grants, and low-interest loans to support farmers in acquiring the necessary technology.
Lack of digital literacy among farmers	Provide simple, user-friendly interfaces and robust training programs to increase digital literacy and familiarity with AI tools.

ID	S17	Name	AI-Powered Real-Time Climate Monitoring
Type	Sectoral	Sectors	Agriculture

Objective

- Leverage AI for real-time climate monitoring to improve weather forecasting and detect extreme conditions. It aims to enhance decision-making for climate response.

Scope and Activity

The AI-Powered Real-Time Climate Monitoring initiative focuses on using AI to analyze vast climate data from sensors and satellites. It provides real-time insights into weather patterns and climate changes. This helps improve accuracy in predicting extreme weather events. The initiative supports better planning for disaster preparedness and environmental protection. It also aids in long-term climate trend analysis for sustainable development policies.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18-24 Months	Priority	Low Medium High

Outcome

- Enhanced accuracy in real-time weather forecasts and climate pattern analysis.
- Faster detection and alerts for extreme weather events, minimizing risks.
- Informed decision-making for climate-related infrastructure and resource management.

KPIs

- Percentage of improvement in climate prediction accuracy.
- Time taken to detect and report weather changes.
- Percentage increase in monitored geographic regions.
- Number of improved emergency response plans informed by AI insights.

Approach and Methodology

- Gather real-time climate data from satellites, weather stations, and IoT sensors to ensure comprehensive coverage.
- Standardize and clean the collected data to create a unified dataset for accurate analysis.
- Utilize machine learning algorithms to identify trends and forecast potential climate changes effectively.
- Develop a system that continuously monitors climate conditions and sends alerts for significant shifts or anomalies.
- Generate dashboards that present actionable insights, enabling stakeholders to make informed decisions quickly.

Prerequisites

- Reliable system for collecting and processing extensive climate data.
- IoT sensors for consistent climate data collection and integration.
- Partnerships with government and research organizations for data sharing and joint efforts.

Risk and Mitigation

Sensor Malfunction	Implement routine maintenance and use backup sensors.
Integration Challenges	Difficulty integrating AI tools with existing systems may result in delays.
Regulatory Compliance Issue	Review regulations and consult legal experts for compliance.

4.7 Security

ID	S18	Name	AI-Driven Biometric Identification Systems
Type	Sectoral	Sectors	Security

Objective

- Implement a biometric identification system at access points to enhance and standardize citizen identification process, ensuring faster processing while adhering to regulatory and ethical standards.

Scope and Activity

The project involves the development, installation, and testing of biometric identification systems (e.g., facial recognition, fingerprint analysis) at airports or similar high-traffic areas. The system must comply with all data privacy laws and ethics standards, ensuring secure handling of personal data. Regular audits will be conducted to verify compliance with data protection and ethical regulations.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	24 – 30 months	Priority	Low Medium High

Outcome

- Biometric identification system will streamline passenger processing at access points, reducing wait times.
- Compliance with data protection laws will build trust in the system, minimizing the risk of breaches.
- Successful testing and deployment will create a blueprint for wider adoption across other access points.
- Adherence to ethical standards ensures the responsible use of facial recognition and other biometric technologies, safeguarding individuals' rights.

KPIs

- Accuracy rate of biometric scans
- System uptime and reliability
- Average time taken for identity verification at access points
- Compliance with data privacy and security regulations
- Customer satisfaction score post-implementation

Approach and Methodology

- Conduct initial discussions with key stakeholders to define the scope and goals of the biometric system. Research available biometric technologies (facial recognition, fingerprint analysis) and compile findings.
- Conduct pilot installations at select access points. Establish repeatable processes for installation and testing, focusing on accuracy, speed, and compliance. Gather feedback from pilot users, identify issues, and develop procedures for future rollouts.
- Roll out biometric systems across all access points with standardized procedures. Conduct real-world testing under various conditions and document installation and testing processes. Establish data handling protocols to ensure compliance and monitor key performance indicators such as accuracy and system uptime.
- Set up continuous real-time monitoring for system performance and compliance. Implement dashboards to track KPIs, automate alerts for anomalies, and conduct regular compliance audits. Analyze data to optimize system performance and refine operational procedures based on findings.
- Leverage AI to optimize biometric accuracy and performance continuously. Implement AI-driven threat detection and dynamic compliance management to address evolving regulations. Use predictive analytics to improve system uptime and refine the user experience with real-time data insights.

Prerequisites

- Regulatory approval for biometric data collection and use.
- Security measures in place to store the data
- Infrastructure for compute and developing AI Models

Risk and Mitigation

Data breach risk	Implement encrypted data storage and multi-factor authentication.
Regulatory non-compliance risk	Regular compliance audits and updates to meet evolving regulations.
System downtime risk	Implement redundant systems and real-time monitoring to prevent outages.

ID	S19	Name	AI-Driven Public Safety and Emergency Response System
Type	Sectoral	Sectors	Security

Objective

- Enhance real-time detection and response to public safety threats using AI.
- Improve emergency response efficiency through predictive analytics.

Scope and Activity

It will use AI to analyze real-time data and improve emergency response times. It aims to enhance coordination between emergency services, ensuring faster decision-making. AI will help identify potential risks early and optimize resource allocation. The system will integrate with existing safety infrastructures for seamless operations. The goal is to improve public safety by using AI to predict and respond more effectively to emergencies.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18-24 Months	Priority	Low Medium High

Outcome

- Reduction in emergency response times, improving the ability to manage crises and reduce casualties.
- Improved accuracy in predicting and preventing public safety risks through data-driven insights and AI-powered analysis.
- Enhanced coordination and communication between public safety agencies, first responders, and relevant stakeholders, ensuring efficient action during emergencies.

KPIs

- Reduction in emergency response time
- Accuracy of AI-based risk predictions
- Increase in coordinated response efficiency
- Public safety improvement

Approach and Methodology

- Gather real-time data from various sources such as sensors, cameras, social media, and public safety databases, integrating it into a central platform for analysis.
- Build and train AI models to analyze the collected data, identify potential safety risks, and forecast emergencies based on patterns and trends.
- Implement AI-powered systems to continuously monitor public safety conditions, generating real-time alerts for imminent threats or incidents.
- Use AI to provide actionable insights for public safety officials, recommending response strategies and resource allocation during emergencies.
- Regularly update AI models and systems based on new data, feedback from responders, and evolving public safety needs, ensuring system efficiency and accuracy.

Prerequisites

- Establish a reliable infrastructure for collecting, storing, and managing diverse data sources relevant to public safety.
- Foster partnerships between government agencies, emergency services, and technology providers to ensure alignment and resource sharing.

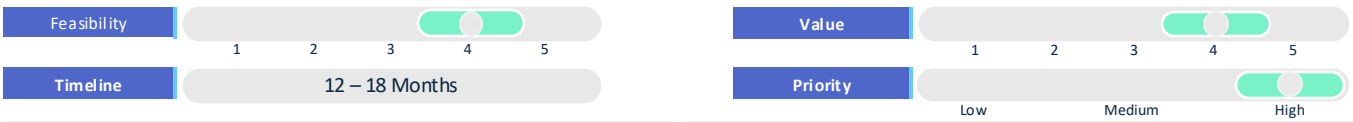
Risk and Mitigation

Data Privacy Concerns	Implement strict data protection protocols and ensure compliance with privacy regulations to protect sensitive information.
AI System Reliability	Conduct thorough assessments of existing emergency response systems and provide comprehensive training to staff to ensure smooth integration with the AI system.
Emergency Response Delays	Establish contingency plans and backup systems to ensure rapid response times in case of technical failures, and regularly test the AI system under various emergency scenarios.

ID	S20	Name	AI-Powered Cybersecurity Threat Detection and Automated Response
Type	Sectoral	Sectors	Security

Objective
- Implement an AI-driven solution that detects and responds to cybersecurity threats in real time, automating threat detection, mitigation, and response to enhance security threats

Scope and Activity
This initiative focuses on developing an AI solution that detects cybersecurity threats such as, malware, phishing attempts, and network intrusions in real-time data for and automated response to minimize threats. The solution will be developed based on large datasets.



Outcome
- The AI solution will detect and mitigate cyber threats in real time, reducing response times and preventing potential breaches.
- The AI solution will continuously learn from new threats, improving its ability to detect and respond to emerging threats
- AI solution will be adaptable across infrastructures, providing a reliable and scalable solution for diverse security needs

KPIs

Reduce in time to detect and respond to cyber threats
Increase accuracy of threat detection and the percentage of false positives or negatives
Number of successful automated threat mitigations without manual intervention

Approach and Methodology
- Initial research focusing on gathering cybersecurity threat data and identifying common vulnerabilities in the existing security framework
- Pilot implementation of the solution to detect known threats such as phishing attempts and initiate collaboration with security teams to prioritize areas for AI implementation
- The AI solution expands to detect a broader range of threats, including advanced persistent threats (APTs). Automated responses are tested, and initiate partnerships with IT departments help integrate AI-driven threat detection into daily operations
- Full-scale implementation of the AI solution across multiple infrastructures, operating in real time, automating responses to various types of cyberattacks. Formal agreements with cybersecurity experts and IT departments ensure long-term deployment and refinement
- The solution continuously learns from new threats and adapts its responses. Strategic investments in AI cybersecurity tools drive innovation and scalability, ensuring that the solution evolves with emerging threats

Prerequisites
- Establish a reliable infrastructure for collecting, storing, and managing diverse data sources relevant to public safety.
- Ensure the solution is trained on extensive datasets of known cyber threats and continuously updated with new threat intelligence
- Early collaboration with leaders to ensure successful development

Risk and Mitigation

False positives or missed threats	Continuously update AI models using real-world data and ensure regular monitoring of automated responses
Data privacy and security	Implement end-to-end encryption and ensure compliance with cybersecurity standards and regulations
Resistance to automation	Provide training and demonstrate the accuracy and efficiency of the AI system in handling threats

ID	S21	Name	Threat Detection and Risk Assessment Initiative
Type	Sectoral	Sectors	Security

Objective

- To develop and deploy AI tools capable of predicting and assessing potential security threats by analyzing patterns, behaviors, and intelligence data to enable proactive defense measures.

Scope and Activity

Utilizing AI to enhance national security by predicting and identifying threats through data analysis. Building AI-powered tools to analyze real-time intelligence data from multiple sources (e.g., communication networks, surveillance systems). Develop predictive models to detect patterns and anomalies indicative of potential security risks. Integrate AI solutions into security and defense systems for monitoring, analysis, and real-time decision-making. Train security personnel to effectively use AI tools for risk assessment and threat mitigation.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 – 18 Months	Priority	Low Medium High

Outcome

- Improved accuracy in detecting and neutralizing potential threats.
- Reduced response times for security incidents.
- Enhanced national preparedness for addressing security challenges.
- Strengthened collaboration between defense agencies and technology partners.

KPIs

- Number of threats detected and mitigated using AI tools.
- Percentage accuracy of AI models in identifying potential risks.
- Reduction in response time to security incidents.
- Number of personnel trained in AI-driven threat detection systems.

Approach and Methodology

- Collect basic datasets from surveillance systems and intelligence reports to develop AI tools for anomaly detection. Conduct small-scale pilots to test AI capabilities in identifying known threats and provide initial training to personnel.
- Expand data sources to include unstructured data such as social media and communication networks, developing models for broader threat patterns. Pilot AI systems in limited areas such as border monitoring or public infrastructure, refining algorithms based on real-world feedback.
- Integrate AI systems into existing defense and security infrastructures to provide real-time risk assessments and decision support. Train personnel extensively on the use of AI tools while rolling out multi-domain applications such as cyber threat detection and urban surveillance.
- Deploy advanced predictive analytics and deep learning models to detect complex threats, integrating these systems with national command-and-control centers. Establish partnerships with private sector and global technology providers to access cutting-edge AI innovations and ensure scalability.
- Use AI systems to address global security challenges, such as cross-border terrorism and international cyberattacks, leveraging international intelligence-sharing frameworks. Host AI-enabled simulations to enhance national defense readiness and refine AI models for future threats.

Prerequisites

- Access to large and diverse datasets for model training.
- Collaboration with technology partners for development and deployment.
- Budget allocation for system development, testing, and scaling.

Risk and Mitigation

High Development Costs	Partner with private tech companies for co-funding and technology sharing.
Skill Gaps in Personnel	Design comprehensive training programs for defense staff to use AI tools effectively.
AI can produce false positives or negatives, risking incorrect decisions or missed threats.	Use a hybrid approach where humans validate AI outputs, focus on training personnel to critically assess AI insights, and continuously refine models with real-world feedback to reduce errors.

4.8 Oil & Gas

ID	S22	Name	AI-Based Price Forecasting and Action Recommendations for Global Markets
Type	Sectoral	Sectors	Oil & Gas

Objective

- Develop an AI-based system to forecast global oil and gas prices, and provide actionable recommendations on where and when to buy based on market conditions.

Scope and Activity

This initiative will involve developing an AI platform for global oil and gas price forecasting, incorporating real-time data from various sources such as geopolitical events, macroeconomic factors, and historical pricing data. It will utilize predictive analytics to provide actionable recommendations on procurement decisions. This platform will be enhanced with features such as dynamic forecasting that accounts for geopolitical risks and environmental factors, improving decision-making accuracy in volatile markets.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	24 – 36 Months	Priority	Low Medium High

Outcome

- Enhanced decision-making by forecasting prices and offering location-based recommendations for optimal procurement.
- Improve cost efficiencies by forecasting price fluctuations with higher accuracy, thus allowing companies to anticipate market trends. Integrating geopolitical risk analysis as done in other countries will further enhance its robustness.
- Facilitate faster, data-driven actions, reducing exposure to sudden price spikes and market volatility.

KPIs

Forecast Accuracy Rate:
Cost Savings from AI Recommendations
User Adoption and Satisfaction Rate

Approach and Methodology

- Set up a robust infrastructure to collect, clean, and integrate data from various sources like global markets, historical pricing, geopolitical events, and environmental factors. Use APIs to automate real-time data ingestion, ensuring the platform has a continuous flow of accurate and up-to-date data.
- Build machine learning models, including time series forecasting and regression algorithms, to predict oil and gas prices. Implement scenario-based forecasting techniques to account for external factors like political instability or natural disasters, ensuring the models can adjust to market volatility.
- Design a specialized risk analysis module that incorporates geopolitical and environmental factors into the pricing model.
- Implement a continuous learning framework to retrain the AI models using feedback from real-world outcomes. Set up a monitoring system to track model performance, compare forecast accuracy, and automatically fine-tune the models to improve predictions over time. Additionally, build a user-friendly interface that displays model performance, predictions, and recommended actions in a clear and actionable format.

Prerequisites

- Access to global market data, geopolitical risks, and environmental factors
- Skilled AI and data science teams and infrastructure for real-time data processing and AI model deployment.
- Compliance with international trading laws and data governance standards.

Risk and Mitigation

Sudden geopolitical events, natural disasters, or economic shifts could disrupt price forecasts.	Incorporate scenario analysis and continuously update models with real-time data, ensuring the system can adapt to unexpected market changes.
Data security concerns	Implement strong cybersecurity measures, including encryption, multi-factor authentication, and regular security audits to protect against threats.
AI models may develop biases due to skewed or incomplete datasets	Regularly audit and fine-tune models with diverse datasets and use bias detection tools to identify and correct potential model biases.

4.9 Tourism

ID	S23	Name	AI Concierge for Personalized Travel Recommendations
Type	Sectoral	Sectors	Tourism

Objective

- Develop an AI-powered concierge platform enhancing tourist experience by offering tailored suggestions for destinations, accommodations, activities, and dining based on preferences

Scope and Activity

This initiative focuses on deploying an AI-based platform that, gathers user preferences to recommend personalized travel itineraries, destinations, and services, offering real-time recommendations based on user location, weather conditions, and events.
While Integrating with local businesses to provide tailored suggestions for restaurants, hotels, and attractions.

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	18 - 24 Months	Priority	Low Medium High

Outcome

- Users will receive tailored, real-time recommendations that match their preferences, resulting in enjoyable and personalized trips
- Users will more likely book services such as accommodations, dining, and activities through the platform, benefiting local businesses and tourism sectors.
- The AI concierge will become a scalable solution, adaptable to various destinations, continuously improving its recommendations based on user data and feedback

KPIs

- Number of tourists using the platform
- Increase customer satisfaction
- Number of established local partnerships
- Ensuring reliable service for end user

Approach and Methodology

- Initiate research of common tourist preferences and pain points, while engaging with tourism partners/ leaders to explore potential use cases for personalized recommendations
- Implementation of AI features/ tools to provide basic travel recommendations (e.g., popular destinations, general itineraries). Pilot programs will test the platform's ability to gather and process user data, with partnerships guiding early adoption
- The platform expands to offer more personalized recommendations based on user preferences and location. A structured testingphase will focus on refining recommendation accuracy and increasing platform adoption
- Implementation of the AI concierge across multiple tourist destinations, offering real-time, personalized recommendations, covering accommodations, dining, and activities
- The AI concierge is a central part of the tourism experience, continuously learning and adapting based on user behavior. Formal agreements with key tourism partners supporting long-term scalability

Prerequisites

- Access to user data (preferences, location, past travel history) to power AI recommendations.
- Strong partnerships with service providers and local governments to ensure a wide range of services
- Reliable AI infrastructure to support real-time recommendations and scalability

Risk and Mitigation

Inaccurate recommendations from AI	Continuously update and refine AI algorithms using user feedback
Privacy concerns	Implement strong data privacy measures and request user consent before data collection
Adoption by businesses	Provide incentives and easy integration options to encourage participation from local service providers

ID	S24	Name	AI-Powered Real-Time Language Translation for International Travelers
Type	Sectoral	Sectors	Education

Objective

- To enable seamless communication for international travelers by providing real-time language translation services on the AI Concierge platform, improving the user experience and reducing language barriers.

Scope and Activity

The AI system will offer multilingual verbal translations and image-to-text translation for signs, directions, and notices. It will include support for multiple languages and provide real-time responses through the AI Concierge platform. Features including voice command integration, offline capabilities, cultural tips, and contextual suggestions. Activities include developing the AI models, training them for multiple languages, and ensuring compatibility across platforms (mobile, kiosks, etc.).

Feasibility	1 2 3 4 5	Value	1 2 3 4 5
Timeline	12 months	Priority	Low Medium High

Outcome

- Travelers experience seamless communication in foreign environments, reducing language barriers.
- Enhancing user experience by providing instant, reliable translations and broad language support. Overall, the AI-powered tool elevates the accessibility and inclusivity of travel experiences.

KPIs

- Number of supported languages
- Accuracy rate of translations (verbal and written)
- Average response time for real-time translation
- Usage metrics (daily active users, repeat users)

Approach and Methodology

- A basic text-based translations for common signs in selected languages. The system is integrated with the AI Concierge platform, focusing on essential translation functions with user feedback loops to improve accuracy.
- The system expands its language library and introduces real-time verbal translation. Voice commands and more accurate image-to-text translations enhance user interaction, providing hands-free functionality.
- The AI begins delivering contextually accurate translations and integrates with GPS to offer location-based suggestions. Translations are personalized, providing travelers with relevant information and improved usability in complex environments.
- At this stage, the system offers multi-modal translation, predictive suggestions, and offline capabilities. Continuous updates ensure accuracy, and the system is fully scalable across platforms.
- The system continuously learns from user feedback, delivering highly personalized translations and cultural insights. It becomes fully inclusive, offering features like text-to-braille and sign language interpretation.

Prerequisites

- Large language data sets
- Robust AI models capable of contextual understanding and quick learning

Risk and Mitigation

Data Privacy	Ensure proper handling of user data by anonymizing translations.
Translation Errors	Translation Errors: Mitigate by constantly updating and training AI models with feedback.
Platform Compatibility	Perform regular testing to ensure seamless performance across devices.

Appendix 5
Initiative Prioritization Methodology

Initiative Prioritization Methodology

AI is transforming nations by driving innovation, improving public services, and boosting economic growth. To fully harness AI's potential, governments must implement national and sectoral AI initiatives that focus on building policies, regulations aligning to the strategic objectives along with strengthening the data-infrastructure ecosystem, developing talent, and enabling sector-specific innovations. However, these initiatives must be carefully prioritized to ensure that they align with a country's maturity level and its strategic focus.

National AI initiatives lay the foundation for AI success across all sectors. These initiatives focus on key enablers such as data governance, infrastructure, and talent development, which are critical to building the capacity to adopt AI. Prioritizing national initiatives ensures that sectoral efforts can be scalable and effective, as they depend on a robust national AI framework.

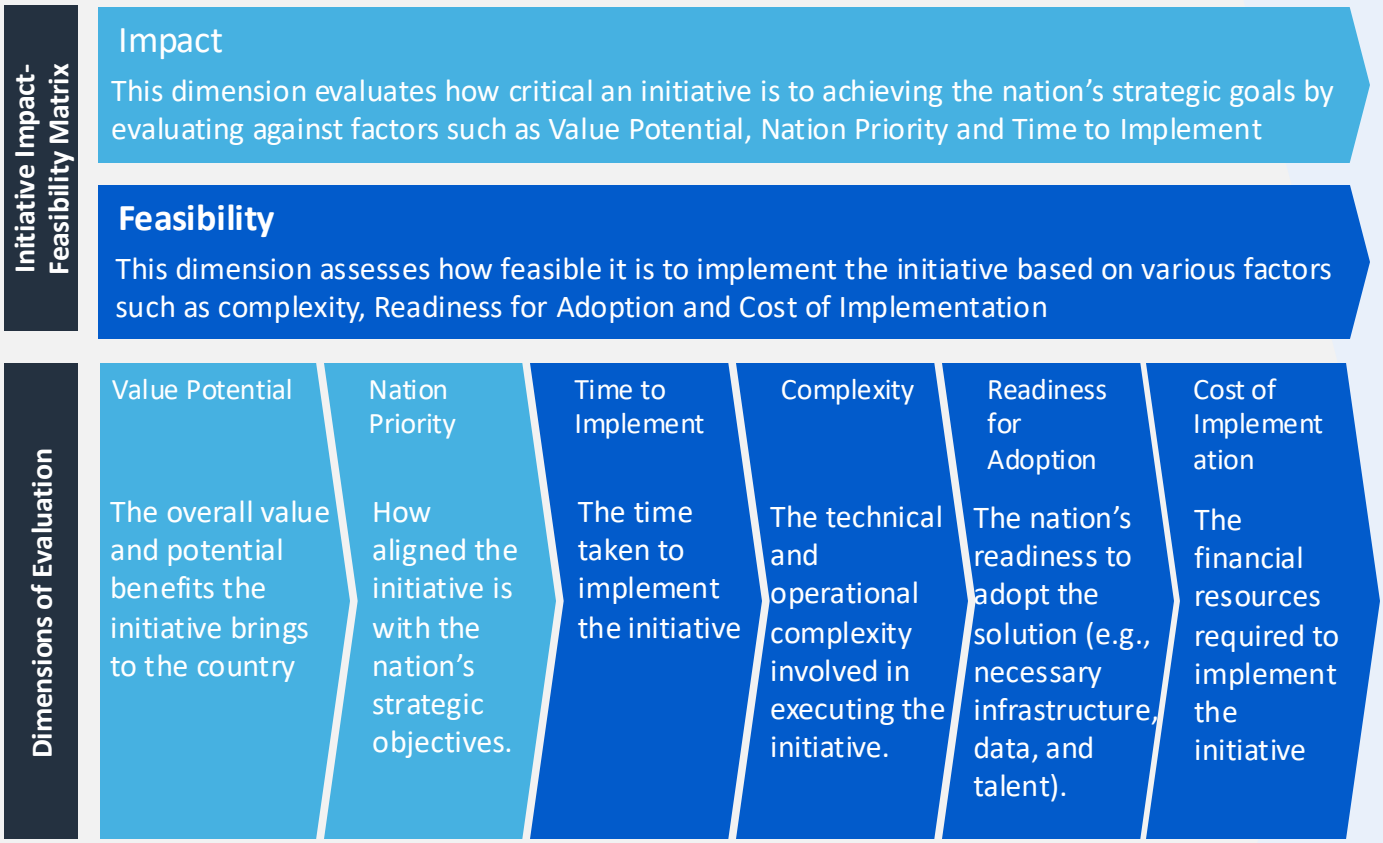
- Building Foundational Capabilities: National-level projects like establishing data policies, investing in AI research and infrastructure, and creating AI education programs enable long-term sustainability for sector-specific AI deployments.
- Creating Alignment: National initiatives create a unified strategy, ensuring that sectors such as healthcare, education, and finance can leverage AI consistently and according to national goals.

How Prioritization Helps AI Implementation

1. **Focus on Impact**: Prioritization ensures that initiatives with the highest potential for national impact, such as improving government services or building a national AI strategy, policies and regulations, are addressed first.
2. **Efficient Use of Resources**: By focusing on high-impact, high-feasibility initiatives, governments can effectively use limited resources like budgets and technical talent.
3. **Alignment with Maturity and Readiness**: Initiatives are selected based on the country's AI maturity. This ensures that efforts are realistic and implementable, preventing over-ambitious projects from wasting resources.

Which initiatives are Prioritized?

1. **Based on Country's AI Maturity**: Countries at different stages of AI maturity will prioritize different initiatives. For example, a nation just starting out may focus on building a national AI strategy and setting policies, while a more mature nation might prioritize sectoral AI applications, such as AI in healthcare or education..
2. **Focused on Key Sectors**: Once national frameworks are in place, sector-specific initiatives can be prioritized. These initiatives should address the unique challenges of priority sectors like healthcare, agriculture, or education, ensuring that AI is deployed where it can create the most impact.

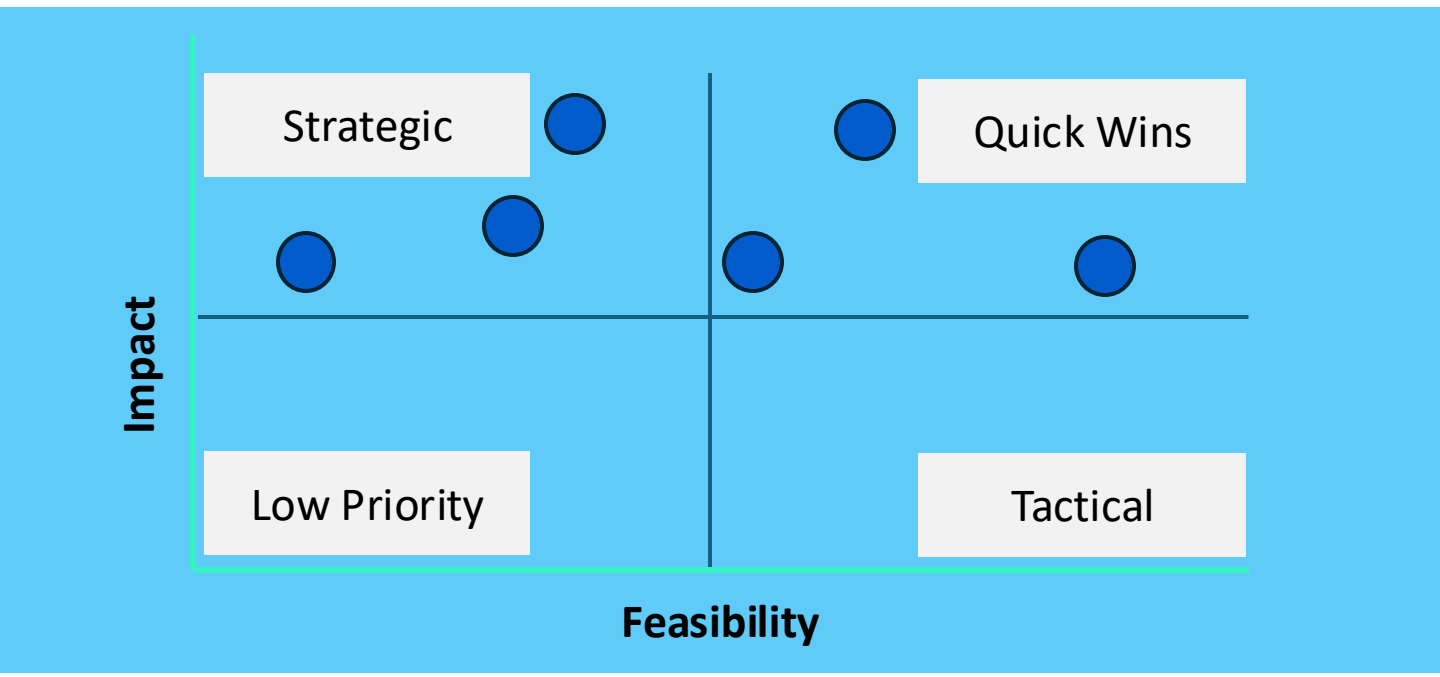


Initiative Scoring Logic				
Dimensions		**Criteria Options**	**Criteria Rating**	**Criteria Rating Defined**
Impact	Value Potential	High Value - Significantly advances national goals, yields substantial benefits, and drives measurable positive impact.	3	High
		Medium Value – Supports meaningful improvements, contributes to steady progress, and adds moderate benefits.	2	Medium
		Low Value - Provides incremental benefits, addresses secondary objectives, and has limited measurable impact.	1	Low
	Nation Priority	High Priority – Impacting all key economic and national priority sectors	3	High
		Medium Priority - Impacting some key economic and national priority sectors	2	Medium
		Low Priority- Impacting none of the key economic and national priority sectors	1	Low
Feasibility	Cost	< $1 M	3	High
		$1M-$5M	2	Medium
		> $5M	1	Low
	Time to Implement	<6 months	3	High
		6-12 months	2	Medium
		> 12 months	1	Low
	Complexity	Low Complexity	3	High
		Medium Complexity	2	Medium
		High Complexity	1	Low
	Readiness for Adoption	AI is a core driver of business strategy and innovation, playing a significant role in transforming business models and delivering competitive advantages. Continuous refinement and improvement of AI systems are ongoing.	3	High
		The organization has a basic understanding of AI's value and has integrated several AI solutions into its daily operations and business processes.	2	Medium
		The organization is exploring AI possibilities but lacks a formal strategy or path for AI implementation and adoption.	1	Low

Quadrants of Prioritization

In this methodology, initiatives are scored based on Impact and Feasibility, and placed on a 2x2 Impact-Feasibility Matrix, adapted from the Six Sigma approach [7]. This matrix helps visually compare and prioritize initiatives:

- **Quick Wins (High Impact, Low Effort):**
  - These are use cases that deliver high value with relatively low effort. They should be prioritized for immediate implementation as they are likely to produce early successes.
- **Strategic (High Importance, High Effort):**
  - These use cases align closely with long-term strategic objectives but may be harder to implement. While they require more resources and time, they should still be prioritized due to their potential high impact.
- **Tactical (Low Impact, Low Effort):**
  - These use cases are relatively easy to implement but have a lower impact on strategic objectives. They could be considered for implementation if resources permit, but they are not a priority.
- **Low Priority (Low Impact, High Effort):**
  - These use cases neither provide high value nor are they easy to implement. They should be deprioritized or revisited later if circumstances change.



Each initiative is scored on both the Impact and Feasibility dimensions. These scores are then plotted on the 2x2 matrix, enabling stakeholders to visually compare initiatives and make informed decisions about which to prioritize.

The initiatives that should be implemented first are those in the Quick Wins quadrant. These initiatives offer high importance and are easy to implement, meaning they provide maximum impact with minimal effort. They deliver immediate value, allowing the organization to build early success and gain momentum.

Next, focus should shift to initiatives in the Strategic quadrant. These initiatives are highly important but require more effort and resources to implement. Though they may take longer and involve more complexity, their alignment with long-term strategic goals makes them essential for sustained growth and impact.

Initiatives in the Tactical quadrant, while easy to implement, have lower importance. These can be considered if resources and time allow but are not a priority.

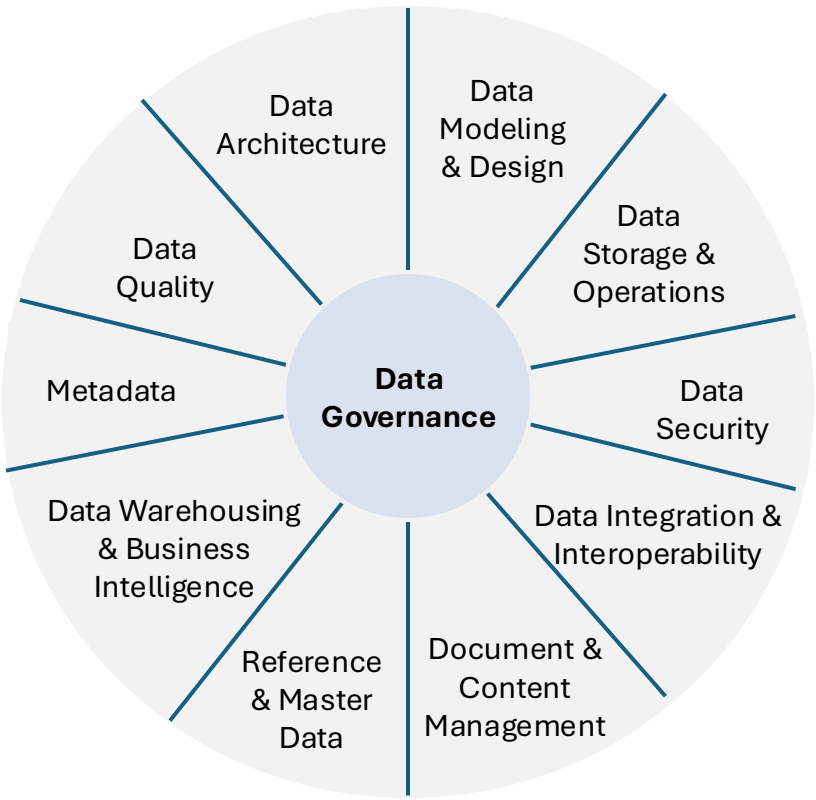
Lastly, Low Priority initiatives (low importance and low ease of implementation) should be deprioritized and reconsidered only if there are significant changes in circumstances.

By following this structured prioritization, the nation can ensure that resources are allocated efficiently and that high-impact AI initiatives are delivered in both the short and long term.

Appendix 6 References for Indicators

6.1 Data Management Body of Knowledge by DAMA

The DAMA-DMBOK (Data Management Body of Knowledge) [8] is a comprehensive guide and framework published by the Data Management Association (DAMA) that provides best practices, standards, and guidelines for effective data management. It covers a wide array of disciplines within data management, ensuring a structured approach to managing data assets. The book aims to provide a framework for data professionals to understand key concepts, strategies, and best practices that can be applied across various industries and organizational types. Governments often establish data management standards to ensure consistency, data quality, and compliance across departments. The following aspects from the DAMA-DMBOK can be used to assess whether these standards are aligned with global best practices:



- Data Governance: Assess the presence of comprehensive data governance policies in government standards. Evaluate whether there are clear roles and responsibilities defined for data management across departments. Ensure the enforcement of data standards, policies, and compliance mechanisms is consistent across departments.
- Data Architecture: Determine whether the government standards provide a coherent data architecture framework that includes interoperability across various systems used by different departments. Check if there are established practices for data flow, integration, and storage that align with DAMA-DMBOK principles.
- Data Security: Review how government standards handle data security and privacy, particularly in line with DAMA-DMBOK's guidelines on protecting sensitive data and ensuring compliance with local and international regulations.

- Data Quality Management: Assess whether data quality standards are defined, monitored, and enforced across departments, ensuring consistency and reliability of data. Examine if there are mechanisms for regular data quality assessments, validation, and improvement.
- Data Integration and Interoperability: Analyze how government standards support the integration of data across departments, enabling interoperability and the seamless exchange of information. Ensure there are guidelines for managing data across different systems and platforms in line with DAMA-DMBOK recommendations.
- Metadata Management: Assess whether metadata standards are applied consistently to provide context and understanding for data across departments. Verify if there are established practices for managing metadata to enhance data discoverability and usability.
- Reference and Master Data Management: Check if government standards address the need for master data management to ensure consistent and accurate data for key entities such as citizens, businesses, and locations across departments.
- Data Storage and Operations: Evaluate the government's guidelines on data storage, ensuring they align with DAMA-DMBOK's recommendations on scalability, security, and operational efficiency.
- Compliance and Ethical Data Usage: Review if the standards emphasize ethical data management practices, especially regarding citizen data, and if they adhere to global data protection regulations.

The DAMA-DMBOK provides a robust framework for managing data that can be applied to assess and align government data standards. The key aspects to focus on when evaluating government standards include data governance, data security, data quality, and data architecture. Ensuring alignment with the DAMA-DMBOK principles would help maintain consistency, accuracy, and security of data across government departments and ensure that data management practices are in line with global best practices.

Refer the National Data Program Initiative in Appendix 2 (page 86) for further details on the strategic framework and its implementation.

6.2 K-12 AI Curricula

The "K-12 AI Curricula: A Mapping of Government-Endorsed AI Curricula" [9] is a comprehensive report produced by UNESCO, focusing on the integration of artificial intelligence (AI) into K-12 education systems across the globe. It provides a detailed analysis of government-endorsed AI curricula from various countries, aiming to guide educators, governments, and institutions on how to effectively develop and implement AI curricula at the primary and secondary school levels.

This report is a mapping exercise that aims to identify and analyze the current state of AI curricula development and implementation. It provides insights into AI literacy, curriculum development and endorsement mechanisms, integration strategies, learning outcomes, teacher training, and essential pedagogical methods.

As AI technology is a relatively new subject in K–12 schools worldwide, there is limited historical knowledge available for governments, schools, and educators to use when defining AI competencies and creating AI curricula. This mapping exercise examines existing AI curricula with a focus on the content, learning outcomes, and mechanisms for development and validation. It also explores curriculum alignment, the preparation of necessary learning tools and environments, recommended pedagogical approaches, and teacher training.

Key insights from this analysis are intended to inform the future development of policies, the design of national or institutional curricula, and effective strategies for implementing AI competency development. The scope of this mapping centers on UNESCO's investigation into current global practices for developing and implementing AI curricula in primary and secondary education.

The document includes:

1.Objective and Scope:

- The report is part of UNESCO's initiative to lead global education efforts aligned with the 2030 Agenda. It highlights the need for AI competency development in schools as AI becomes a critical component in daily life and the labor market.
- The mapping covers AI curricula that are officially endorsed by national or regional governments and targets general school education from kindergarten to grade 12 (K-12).

2.Curriculum Development:

- The report outlines how countries like China, India, Austria, the Republic of Korea, and others have developed and endorsed AI curricula. These curricula are mostly government-led, ensuring that they are aligned with national education goals. It also highlights the motivations behind curriculum development, such as preparing students for the AI-driven job market and promoting equitable access to AI education.

6.2 K-12 AI Curricula

3. AI Literacy and Competencies:
- The document emphasizes the need for AI literacy, which includes understanding AI technologies, ethical considerations, data literacy, and machine learning concepts. It provides frameworks like AI4K12 and the Machine Learning Education Framework to support these objectives.

4. Curriculum Content and Learning Outcomes:
- The curricula generally cover three broad categories: AI foundations, ethical considerations, and practical AI tool development. The report analyzes how different countries allocate time to these areas and provides examples from specific nations like Austria and Qatar.

5. Teacher Training and Support:
- Effective implementation of AI curricula depends heavily on teacher training. The report emphasizes the need for teachers to be trained in both AI-specific knowledge and new pedagogical approaches.

How the Report Can Serve as a Guide or Framework

This report can be considered both a **guide and a framework**. It serves as a reference for governments and educational institutions looking to:
- Develop new AI curricula for K-12 students by offering a global perspective on existing initiatives.
- Integrate AI education into their existing frameworks by highlighting best practices and curriculum design principles.
- Equip teachers with the necessary knowledge and tools to effectively teach AI concepts.

Potential Benefits for Other Countries

This document provides a roadmap for countries that are yet to develop or implement AI curricula. By offering insights into how AI education is being handled globally, it can help governments:
- Understand the **essential competencies** required for AI literacy and tailor their education systems to meet these needs.
- Promote **AI ethics and responsible use** in the classroom to prepare students for the societal impacts of AI.
- Design **inclusive curricula** that address gaps in AI knowledge and participation, ensuring equitable access to AI education for all students.
- Support **teacher training** initiatives to ensure that educators can effectively impart AI knowledge.

By using this report as a reference, countries can foster an AI-literate workforce, essential for staying competitive in the global AI landscape and preparing students for the demands of future job markets.

This comprehensive approach ensures that AI is introduced into educational systems in a way that is accessible, ethically sound, and scalable across different nations.

Refer the National AI curriculum and scholarship programs in schools and university Initiative in Appendix 3 (page 84) for further details on the strategic framework and its implementation.

6.3 AI Competency Framework for Students by UNESCO

The "AI Competency Framework for Students" [10] is a comprehensive global guide developed by UNESCO to outline the essential competencies required for students to thrive in the era of artificial intelligence (AI). It serves as a **framework** aimed at supporting public education systems in integrating AI-related knowledge, skills, and ethical considerations into national curricula. The primary goal is to equip students with the necessary competencies to become responsible and active co-creators of AI technologies while fostering an ethical and human-centered approach to AI usage and development.

Key Contents of the Framework:

1. **Purpose and Target Audience**: The framework is designed for policymakers, curriculum developers, educators, and school leaders to guide the creation of AI competencies that align with national AI strategies. It promotes inclusive, equitable education and focuses on ensuring students develop critical thinking skills, ethical judgment, and practical AI knowledge.
2. **Four Core Aspects**:
    1. **Human-centered mindset**: Focusing on human agency, accountability, and citizenship in the AI era, this aspect ensures students understand the role of humans in designing, controlling, and benefiting from AI.
    2. **Ethics of AI**: This addresses embodied ethics, the safe and responsible use of AI, and the application of ethics-by-design principles, ensuring that students are aware of the ethical implications of AI systems.
    3. **AI Techniques and Applications**: Covering foundational AI knowledge, application skills, and AI tool creation, this aspect ensures students are equipped with technical skills.
    4. **AI System Design**: This focuses on problem scoping, architecture design, and the creation of AI systems, aiming to enable students to design and implement AI solutions.
3. **Progression Levels**: The framework outlines three levels of competency development—**Understand, Apply, and Create**—to ensure a gradual and progressive mastery of AI skills and knowledge:
    1. **Understand**: Students develop a foundational understanding of AI principles and concepts.
    2. **Apply**: Students gain the ability to apply AI knowledge to solve real-world problems.
    3. **Create**: Students become innovators, designing and developing AI systems to address complex challenges.
4. **Key Principles**: The document emphasizes fostering critical thinking, prioritizing human-centered interactions, promoting environmentally sustainable AI, and building competencies for lifelong learning. It also highlights the importance of inclusivity in AI education, ensuring all students have access to AI learning opportunities regardless of their background or resources.

6.3 AI Competency Framework for Students by UNESCO

How This Framework Can Benefit Other Countries:
This framework serves as a **global reference** for countries seeking to develop AI literacy and integrate AI education into their K-12 systems. It offers clear guidance on how to develop core AI competencies that are adaptable to different local contexts and education systems. By adopting this framework, countries can:

- **Prepare students for the future**: Equip students with the necessary skills to engage responsibly with AI technologies and contribute to AI's development.
- **Promote ethical AI usage**: Encourage students to adopt ethical AI practices, emphasizing human rights, inclusivity, and environmental sustainability.
- **Support curriculum development**: Provide a structured approach to integrating AI education across grade levels, ensuring students receive age-appropriate and progressively challenging AI education.
- **Foster global collaboration**: By aligning with this framework, countries can contribute to a globally harmonized approach to AI education, promoting shared goals of inclusivity and responsible AI development.

The AI Competency Framework is a critical tool for empowering students and educators to navigate and shape the evolving AI landscape, ensuring that AI contributes to the development of just, equitable, and sustainable societies.

Refer the National AI curriculum and scholarship programs in schools and university Initiative in Appendix 3 (page 84) for further details on the strategic framework and its implementation.

6.4 Planning an Incubator by infoDev

This document [11] is part of a broader training program developed by infoDev to guide business incubator managers, particularly in developing countries. infoDev is a World Bank Group multi-donor program that supports entrepreneurs in developing economies. The program emphasizes capacity building and entrepreneurship in technology-enabled enterprises. It aims to train incubator managers in all aspects of incubation, with modules covering feasibility studies, business planning, management, financing, monitoring, evaluation, and benchmarking.

The second part of this module focuses on **business planning**, guiding the development of a strong business model based on a feasibility study, vision, and mission statements.

Key Components of Business Planning

1. Vision and Mission Statements

- **Vision** defines the long-term aspirations of the incubator, answering the question: "What do we want to achieve in the future?"
- **Mission** describes the current purpose, the business the incubator is in, and what it aims to achieve. It aligns stakeholders and guides daily operations.

A clear vision statement serves as a motivational tool for all stakeholders. Examples from successful incubators such as Bulungula in South Africa and Ankara Cyberpark in Turkey illustrate how these visions translate into strategic focus areas.

2. Developing a Sustainable Business Model

- Identifying the services to be offered (e.g., mentoring, funding assistance, physical space, and networking).
- Pricing strategies for services.
- Establishing revenue streams, which may include tenant fees, sponsorships, grants, and service fees.

The business model must be tailored to the specific needs of the local market, stakeholders, and potential incubator clients.

3. Components of the Incubator Business Plan

- **Executive Summary**: Overview of the incubator's purpose, strategic goals, and how they will be achieved.
- **Market Analysis**: A thorough market analysis, addressing demand for incubation services and the competitive landscape.
- **Operational Plan**: This outlines the day-to-day operations, including staff roles, service delivery mechanisms, and client engagement strategies.
- **Financial Plan**: Includes budgeting, financial projections, and strategies for achieving financial sustainability.

The document emphasizes the need for the incubator manager and stakeholders to "own" the business plan and continually review and update it to reflect changing market conditions and incubator performance..

6.4 Planning an Incubator by infoDev

4. Marketing and Stakeholder Engagement
Marketing is critical to ensuring that the incubator reaches its target audience and achieves its mission. The plan should include:

- **Identifying Key Stakeholders**: This includes potential clients, partners, investors, and government agencies.
- **Value Proposition**: Defining the incubator's unique selling points, what sets it apart from competitors, and why stakeholders should engage.
- **Marketing Channels**: Selecting the right channels (e.g., social media, events, public relations) to reach different stakeholders effectively.

5. Management and Operational Planning
Effective management practices ensure the smooth operation of the incubator. This includes:

- **Governance Structure**: Setting up a board of directors or advisory committee with clear roles and responsibilities.
- **Human Resources**: Hiring skilled staff, providing training, and ensuring that the incubator team has the right mix of business, technical, and managerial expertise.
- **Performance Monitoring**: Establishing Key Performance Indicators (KPIs) to track the incubator's success, measure client outcomes, and inform strategic adjustments.

Benefits for Other Countries:
For countries looking to foster entrepreneurship and economic development, this document serves as a **critical reference**. It offers a step-by-step guide on how to:

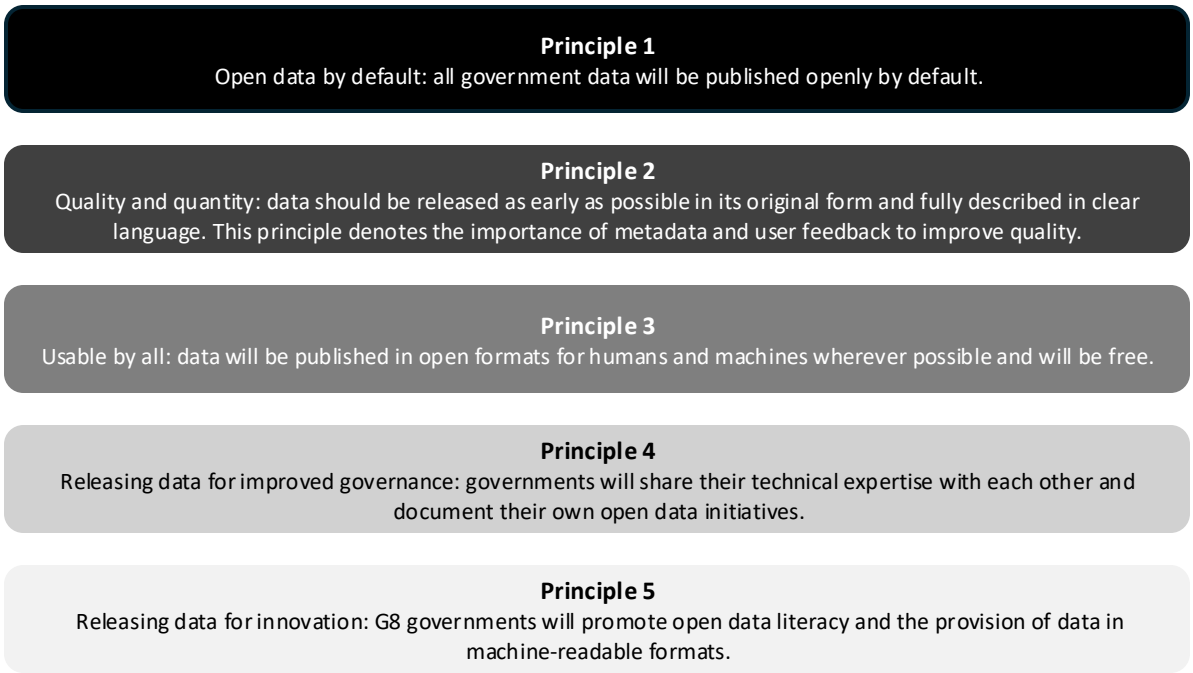
- **Conduct feasibility studies** to determine the viability of business incubators.
- **Develop business plans** aligned with local economic goals and market demands.
- **Engage stakeholders effectively**, ensuring support from both government and private sectors.
- **Implement sustainable business models**, which are essential for incubators to survive in competitive markets.

By using this document as a reference, other countries can significantly increase their capacity to create incubators that support local businesses, spur job creation, and promote innovation. This, in turn, can lead to greater economic diversification, technology commercialization, and sustainable development.

Refer to the AI Startup Accelerator Programs Initiative in Appendix 3 (page 89) for further details on the strategic framework and its implementation.

6.5 Open Data Goldbook for Data Managers and Data Holders

The Open Data Goldbook for Data Managers and Data Holders [12] is a practical guide aimed at supporting organizations in publishing Open Data, with a particular focus on public sector data. Published as part of the European Data Portal project, it outlines the key principles, strategies, and technical requirements necessary for successful Open Data initiatives. It serves as both a framework and a guide for data managers, developers, and policymakers.



Summary:

1.Key Definitions and Concepts:

- **Open Data**: Defined as legally and technically open data that can be freely used, modified, and shared by anyone. Open Data must be published under open licenses and in machine-readable formats.
- **Public Sector Information (PSI)** and **Open Government Data (OGD)**: PSI refers to data collected by public sector entities, which can become Open Government Data when made freely available under open licenses.
- **Benefits of Open Data**: Include transparency, citizen engagement, innovation, economic growth, and cost savings for governments.

2.Building an Open Data Strategy:

- **Setting the Ambition**: Organizations are encouraged to define their goals, assess their current state (As-Is situation), and visualize their desired future state (To-Be situation).
- **Drafting an Open Data Policy**: The guide details how to draft a comprehensive Open Data policy, covering aspects such as data types, scope, licensing, and legal considerations.

6.5 Open Data Goldbook for Data Managers and Data Holders

3. Overcoming Barriers:

- The document addresses common barriers such as organizational resistance, data quality concerns, and the fear of negative reputational impact. It suggests strategies to overcome these barriers, such as demonstrating the benefits of transparency and engaging internal stakeholders early in the process.

4. Technical Preparation and Implementation:

- **Data Management**: Emphasizes the need for structured data management, whether centralized or federated. The guide also details technical steps for extracting, transforming, and publishing data (the ETP process), as well as options for making data accessible through APIs, data portals, or web downloads.
- **Open Data Lifecycle**: Organizations are guided through the stages of data collection, preparation, publishing, and maintenance, ensuring that Open Data initiatives remain sustainable and up-to-date.

5. Engaging Users and Measuring Success:

- The guide recommends ongoing engagement with data re-users and the importance of monitoring the impact of Open Data initiatives through defined Key Performance Indicators (KPIs). It also encourages using feedback mechanisms to continually improve the quality of published data.

6. Roles and Responsibilities:

- Four key roles, or "personas," are identified in the Open Data lifecycle: Decision Makers, Data Managers, Developers, and Contributors. Each role is described in terms of their responsibilities, with an emphasis on collaboration across teams to ensure successful Open Data initiatives.

Usefulness to Other Countries:

The Open Data Goldbook is a valuable resource for countries looking to enhance their Open Data efforts. It provides a comprehensive framework that can be adapted to different legal, technical, and organizational contexts. The guide's emphasis on transparency, economic growth, and citizen engagement aligns well with global efforts to improve governance through Open Data. By providing concrete examples and best practices, it offers a roadmap for countries at varying stages of Open Data maturity.

Additionally, the Goldbook's step-by-step approach to policy development, data management, and technical implementation makes it accessible for countries starting their Open Data journeys.

This guide will help countries establish Open Data initiatives by providing a clear structure for decision-making, technical planning, and user engagement, ensuring that their Open Data programs are successful and sustainable in the long term.

Refer the National AI workbench for collaborative research, development, and innovation and National Data Program Initiative in Appendix 3 (page 80 and 86) for further details on the strategic framework and its implementation.

6.6 Governing AI for Humanity

The Governing AI for Humanity [13] report by the United Nations (September 2024) addresses the urgent need for a globally coordinated governance framework for AI technologies. It emphasizes that while AI offers transformative benefits—advancing scientific research, optimizing industries, and supporting Sustainable Development Goals (SDGs)—it also presents significant risks such as bias, misuse in surveillance, autonomous weapons, and disinformation. The report identifies gaps in the current AI governance landscape, particularly the lack of representation from many nations, fragmented regulatory approaches, and the absence of enforceable mechanisms.

The report calls for a comprehensive, inclusive, and cooperative international approach to AI governance. Key recommendations include creating a Global Scientific Panel on AI, establishing frameworks for policy dialogue, and promoting interoperable standards to ensure ethical AI use. It also highlights the need for capacity-building in developing nations to avoid deepening the digital divide.

The importance of this document lies in its push for a unified, equitable, and ethical approach to AI governance, ensuring that AI's benefits are shared globally while minimizing risks. This report provides a roadmap for ensuring that AI is developed and deployed in a way that serves humanity, protecting human rights and fostering sustainable development.

Below highlight the global representation gaps in AI governance, the following figure 21 illustrates the disparity in participation among countries in international AI governance frameworks. It emphasizes the need for greater inclusivity and collaboration, especially for nations in the Global South that are currently underrepresented in key AI governance initiatives. This underscores the importance of ensuring that AI governance frameworks are equitable and globally encompassing, as emphasized in the 'Governing AI for Humanity' report.

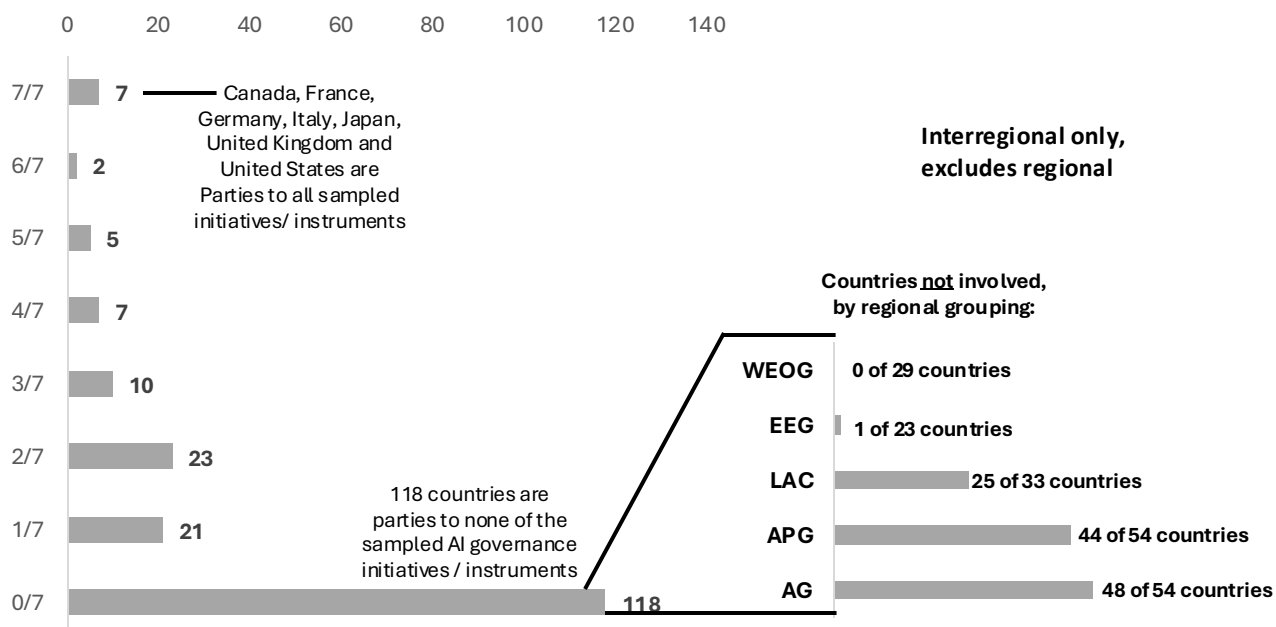


Figure 21: Sample:
OECD AI Principles (2019), G20 AI Principles (2019), Council of Europe AI Convention drafting group (2022–2024), GPAI Ministerial Declaration (2022), G7 Ministers' Statement (2023), Bletchley Declaration (2023), and Seoul Ministerial Declaration (2024).

6.6 Governing AI for Humanity

These points serve as a foundational reference for understanding the global AI landscape and the actions needed to ensure AI is governed in a manner that benefits all of humanity."

- Global AI Governance: AI's development and deployment necessitate a global approach. The report emphasizes the need for coherent, internationally coordinated AI governance to prevent inequitable distribution of AI benefits and mitigate risks such as bias, surveillance, disinformation, and loss of human autonomy.
- Ethical AI Use: The UN report highlights the importance of ethical frameworks guiding AI across sectors to ensure human rights are respected. The focus is on creating structures that govern AI in ways that protect individuals, marginalized communities, and global security.
- Collaboration and Capacity Building: AI governance should involve a multi-stakeholder approach, engaging governments, the private sector, and civil society. Additionally, capacity-building initiatives, especially in underrepresented regions, are crucial to ensure inclusive participation in the global AI ecosystem.
- AI Risks: The report identifies various risks, including AI-enhanced surveillance, autonomous weapons, environmental impacts due to AI's energy consumption, and the reinforcement of inequalities due to the digital divide.
- Global AI Governance Gaps: There are gaps in AI governance representation, coordination, and implementation. Many countries, especially in the Global South, are not part of key AI governance initiatives, which could widen the AI divide.
- Actionable Recommendations:
    - Establish a Global Scientific Panel on AI to provide impartial, reliable knowledge and research on AI technologies.
    - Create AI governance policy dialogues to foster best practices and interoperable approaches.
    - Develop an AI Standards Exchange to unify definitions and standards across different regions.
    - Set up a Global Fund for AI to address the AI divide and provide resources for underrepresented nations.

Refer the National AI related policy development Initiative and National Responsible AI Framework Establishment in Appendix 4.3 (page 76 and 77) for further details on the strategic framework and its implementation.

6.7 The Role of Artificial Intelligence in the European Green Deal

The European Green Deal [14] pursues ambitious environmental goals which require a green transformation of many sectors of society. The transformative potential of Artificial Intelligence (AI) to contribute to the achievement of the goals of a green transition has been increasingly and prominently highlighted. At the same time, digital technologies such as AI considerably increase energy and resource consumption and create risks of adverse environmental effects. This ambiguous picture illustrates that political and regulatory action is necessary to channel the potential of AI towards the goals of the European Green Deal. Tailoring and implementing effective AI policies presuppose a solid understanding of the socio-technical mechanisms that may lead to desired or undesired consequences of AI. This report aims to contribute to the development of such an understanding.

AI Systems and applications have a broad range of significant potential to support a socio-ecological transformation, their deployment can also result in serious and far-reaching environmental risks. Environmental policy and regulation in principle have a broad spectrum of instruments at their disposal to enable the development of technologies and innovations in a goal-oriented manner, as well as to protect and take precautions against specific sustainability risks.

Here are some recommendations mentioned:

- **Strengthen research on AI systems and their applications for the goals of the European Green Deal**

The EU has already set the right priorities in its new EU Multiannual Financial Framework for 2021-2027 to strengthen digital capacity through the Digital Europe Program (DEP), the Connecting Europe Facility (CEF2), Horizon Europe, and the Space Program. In particular Horizon Europe includes key research programs on AI in relevant sectors linked to environmental objectives. The DEP is focused on more general strategic areas and it is less clear to what extent it will benefit AI applications in all areas of the EGD with testing and experimentation facilities or data spaces Thus, further implementation should ensure that this focus is fully reflected. It will be important to ensure coordination among the four key EU research programs for effective funding across all the diverse topics of the EGD.

- **Develop, promote and implement methodologies for environmental impact assessments of AI technologies**

As an approach to operationalizing the various initiatives to establish and apply ethical values and norms for AI applications, the EU should promote or require new AI systems to undergo impact assessments that sufficiently cover environmental sustainability criteria before their large-scale use. Such assessments should go beyond the direct environmental impact of the AI system itself (raw materials, energy use) and cover also indirect impacts of the use and operation of the AI application. While these impacts will be more difficult to assess, respective methodologies could draw upon the family of approaches of policy impact assessments, sustainability impact assessments, or strategic environmental assessments.

6.8 The Role of Artificial Intelligence in the European Green Deal

- **Empower Transformative Systems and Applications in Digital Markets**

The purpose for which AI systems are developed and utilized is critical to foresee whether they will make their decisions by environmental goals. It is thus plausible that sustainable policies focus on capacitating stakeholders of (environmental) public interest who develop and apply AI systems in line with sustainability goals. It also makes sense to provide private sector actors with incentives to develop AI applications that are designed to achieve environmental goals. Such indirect strategies of environmental regulation can be put forward in several ways.

- **Explore, develop and promote a European model of the data economy harnessing data as a resource for sustainable AI**

Related to environmental issues, it is essential to support open access to relevant data and initiatives working to enlarge the open datasets. This allows thematic fields to be covered that do not necessarily present an easy business case and the inclusion of neglected geographical regions and countries. As the World Development Report (World Bank 2021) states: "A global consensus is needed to ensure that data are safeguarded as a global public good and as a resource to achieve equitable and sustainable development." The 'Common Europe Green Deal Data Space' to support the Green Deal priority actions on climate change, circular economy, zero-pollution, biodiversity, deforestation and compliance assurance and the start of the 'GreenData4All' initiative as part of the EU data strategy are important steps in this direction.

What are the Best Practices across Different Countries?

Denmark intends to be a frontrunner, using AI to support the green transition. The country developed the following priority approaches(Danish Government 2019):

- The public sector should benefit from an intelligent environmental monitoring, prediction of flooding during cloudburst events and management of drainage systems.
- The Danish government will identify five public-sector datasets, which can be made available for businesses, researchers and public. The datasets will not contain personal data, but rather environment and climate data from the transportation sector.
- Through membership of ESA, Denmark is also helping to gather and process large amounts of weather, environment and climate data. Most of this data is freely available for citizens, businesses, public authorities and researchers.

6.8 The Role of Artificial Intelligence in the European Green Deal

Hungary also committed in its national AI strategy to develop AI to be high-tech and green. Hungary is the only Member State with quantified environmental targets in the AI strategy (Ministry for Innovation and Technology et al. 2020). Due to the use of data-based systems, the emissions of ammonia in agriculture should decrease by 32%by 2030. By 2030, 70% of the scheduling of renewable energy productions should be carried out by smart technologies. Hungary's AI strategy includes transformative programs which address several areas of the EGD: Climate-driven agriculture: AI to help mitigate adverse impacts of climate change in agriculture;

- Development and application of AI-based, optimization solutions in terms of plant production and stock farming, implementation of predictive, AI-based analytics methods to improve water, soil and air quality to enhance the efficiency of management;
- Establishment of an agricultural data framework system including environmental data to enhance the efficiency of government operations and develop new services for farmers; and
- Implementation of smart grid technologies to facilitate the creation of a more accurate production timeline for weather-dependent renewable energy sources and the operation of the energy network.

France's national AI strategy also includes a strong commitment to use AI opportunities in the environmental area to contribute to a smart ecological transition (President of the French Republic 2019). Priority areas are:

- Transport: zero-emission urban mobility;
- Agriculture: the development of monitoring tools for farmers will pave the way for smart agriculture benefiting the entire agrifood chain; and

Italy's national AI strategy also has the clear objective that AI should support the implementation of the Sustainable Development Goals(Ministry of Economic Development 2019). Priority sectors in the strategy are:

- Environment, infrastructures and networks: AI solutions to achieve savings in the use of resources (water, electricity and natural gas), reduction in polluting emissions (e.g. monitoring and intelligent management of networks and consumption), strengthening of the circular economy (e.g. monitoring and predictive management of the waste cycle), better prevention of natural disasters;
- Agri-food sector: avoiding overproduction and waste, precision agriculture, optimization of food processing, storage and transport processes; and
- Smart cities: intelligent parking, traffic management and control of signs, management of lighting and optimization of public transport.

Refer to the AI-Driven Renewable Energy Integration for Smart Grids initiative, AI-Driven Energy Monitoring and Optimization for Municipal Infrastructure and AI-Powered Energy Consumption Forecasting in Appendix 4 (page 108, 109 and 110) for further details on AI-Powered Energy Consumption Forecasting the strategic framework and its implementation.

6.9 AI Regulatory Sandboxes

The EU AI Act emphasizes the importance of AI regulatory sandboxes [15] in promoting inclusive access to government-supported AI technologies. By requiring member states to establish these environments, the Act ensures that diverse entities, including small and medium-sized enterprises (SMEs) and start-ups, can engage in the development and testing of AI solutions. This approach fosters an ecosystem where innovative ideas can flourish without the immediate pressures of market entry.

- ✓ **Promoting Collaboration Across Sectors:**
  The regulatory sandboxes facilitate cross-sector collaboration, allowing organizations from different industries to share insights and best practices. This environment promotes innovation and ensures that AI technologies can address a broader range of societal needs. By encouraging diverse participation, the Act helps create AI solutions that are not only effective but also socially responsible and tailored to meet various community needs.

- ✓ **Ongoing Monitoring and Evaluation:**
  The EU AI Act mandates continuous support and monitoring within these sandboxes, ensuring that AI technologies are developed with safety and ethical considerations at the forefront. This includes regular assessments to identify potential risks related to safety and fundamental rights. Entities participating in the sandbox receive guidance on regulatory compliance, which helps them navigate the complexities of AI development while promoting accountability and transparency.

- ✓ **Feedback Loops for Continuous Improvement:**
  The structured environment of the regulatory sandboxes allows for the establishment of feedback loops, where participants can receive input on their AI systems from both regulatory bodies and other developers. This ongoing feedback is crucial for refining AI solutions, addressing any ethical concerns, and ensuring that technologies evolve in alignment with user needs and regulatory expectations.

How does the EU AI Act ensure the accessibility of government-supported AI technologies?

The Act requires member states to establish AI regulatory sandboxes, enabling entities across various sectors to test and develop AI technologies in a safe, monitored environment. These sandboxes promote equitable access, particularly for SMEs and start-ups, ensuring AI systems are tested for compliance before market release.

In summary, the EU AI Act, through its regulatory sandboxes, promotes equitable access to AI technologies, fosters collaboration across sectors, and ensures ongoing support and monitoring. These measures are vital for developing inclusive and responsible AI solutions that benefit all stakeholders.

Refer to the AI Innovation sandbox for development in Appendix 3 (page 78) for further details on the strategic framework and its implementation.

6.10 HAI AI Index 2024 Report

- The HAI AI Index 2024 Report [16] provides insights into the state of AI research and development globally, including AI patents and academic publications. It highlights significant trends in AI publications, patents, and conferences, as well as the growing influence of industry and academia in advancing AI technologies.

AI Patents and Publications:

- Globally, the number of AI-related patents and academic publications has seen significant growth. From 2021 to 2022, AI patent grants increased by 62.7%, and the number of AI-related publications has nearly tripled from 88,000 in 2010 to over 240,000 in 2022. The increase in AI patents and publications is indicative of countries prioritizing AI research and innovation.
- AI Patents: As of 2022, China accounted for 61.1% of global AI patent origins, while the United States accounted for 20.9%. There has been a marked shift, with China's share of AI patents rising significantly over the past decade. This trend reflects the growing competition between countries in advancing AI technology.
- AI Publications: AI-related publications have continued to rise globally, with major growth in fields like machine learning, which had over 72,000 publications by 2022. The rise in academic research is driven by the increasing importance of AI in various sectors such as healthcare, robotics, and education.

National Trends: Countries like the U.S. and China are leaders in AI patents and publications, and the trend indicates that other nations are also ramping up their efforts to file patents and produce academic research in AI. The 2024 AI Index demonstrates that these advancements reflect not only technological innovation but also a growing focus on AI research and development (R&D).

Global Leadership in AI Patents: China and the U.S. dominate the AI patent landscape, with the number of AI patents growing over 31 times since 2010. This demonstrates the sustained increase in AI research efforts and the focus on protecting intellectual property.

Growing AI Research Focus: According to the report, the increase in both AI patents and academic publications shows that many countries are increasingly investing in AI R&D to maintain global competitiveness. This surge in AI activity reflects the national focus on building a robust AI ecosystem.

In conclusion, the report shows that the number of AI-related patents and academic publications continues to rise, signaling a significant global emphasis on AI innovation and research. Countries aiming to foster AI development should closely track their own patents and publications to assess progress and competitiveness.

Refer to AI Training, Certification, and Upskilling Programs initiative in Appendix 3 (page 85) for further details on the strategic framework and its implementation.

6.11 PwC's AI Adoption Study

The study [17] analyzes the current state and trends of AI adoption across various sectors. It highlights the increasing integration of AI platforms into organizational operations, emphasizing the need for scalable AI solutions. The report provides insights into challenges, benefits, and the future potential of AI technologies in driving efficiency, improving customer experience, and optimizing decision-making.

- **Integration of Scalable AI Platforms:** Organizations are increasingly integrating scalable AI platforms nationwide to streamline deployment and enhance data access across various sectors.
- **Benefits of Full-Scale Integration**: Achieving full-scale AI integration leads to improved deployment processes, enabling organizations to respond more effectively to market demands.
- **Routine Monitoring for Continuous Improvement:** Ongoing performance monitoring ensures that AI systems are regularly evaluated and optimized to meet evolving business needs.
- **Support for Diverse Sectors:** Nationwide integration of AI platforms fosters collaboration and innovation across industries, promoting equitable access to AI technologies.
- **Sustainability and Long-Term Performance:** Continuous enhancements to AI deployment contribute to long-term sustainability, driving revenue growth while optimizing operational efficiency.

The following are the main barriers for adopting AI:

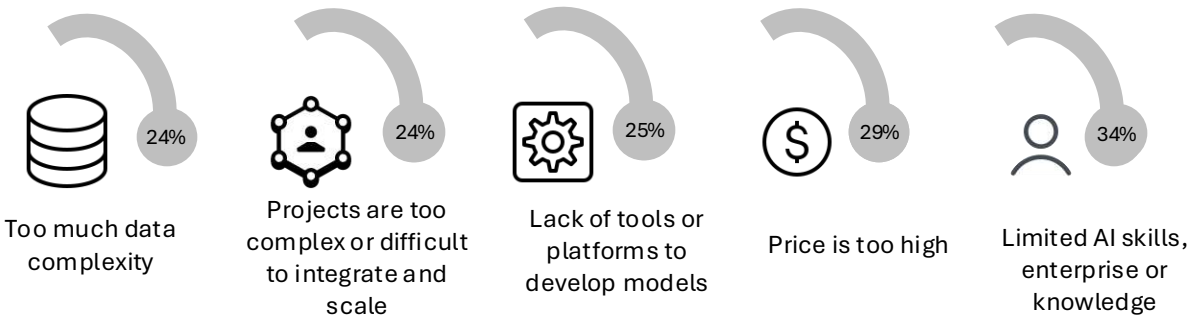


Figure 22 : Barriers of Adopting AI

Refer to AI Startup Accelerator Programs Initiative in Appendix 3 (page 89) for further details on the strategic framework and its implementation.

6.12 Stanford AI Index Report 2024

The Stanford AI Index Report (2024) [18] provides a comprehensive analysis of AI trends across sectors, including technical advancements, economic impacts, and ethical concerns. It highlights AI's increasing integration into sectors such as healthcare, finance, and defense, showcasing significant improvements in efficiency and decision-making. The report also emphasizes the importance of monitoring AI's societal impact, regulatory frameworks, and its contribution to productivity and innovation.

- **AI's Role in Driving Innovation:** The report outlines how AI is a transformative force in reshaping industries. It points out that AI is not only improving existing workflows but also driving innovation by introducing new capabilities in fields such as automation, data analysis, and predictive modeling. This has led to significant productivity gains in industries ranging from manufacturing to finance.
- **Ethical Considerations and Governance:** In addition to performance improvements, the report stresses the importance of ethical AI deployment. As AI continues to be adopted on a larger scale, organizations are increasingly focused on developing regulatory frameworks and governance models to manage risks such as bias, privacy concerns, and security threats.

The Stanford AI Index Report (2024) provides valuable insights into how AI adoption is transforming key sectors, such as healthcare, defense, and finance, by improving efficiency, decision-making, and scalability. The report also highlights the importance of continuously monitoring AI platforms to ensure ongoing improvements and long-term sustainability. Below are some key takeaways from the report, illustrating how AI integration across various industries contributes to operational enhancements and overall performance

- **Sector-Specific Improvements:**

In healthcare, AI adoption has enhanced diagnostics, medical imaging, and personalized treatment plans. The report cites AI-driven decision-making tools that assist clinicians, improving the accuracy and speed of diagnosis.

In defense, AI is improving surveillance, threat detection, and operational efficiency. By automating routine processes, AI allows for better resource allocation and improved decision-making in mission-critical situations.

- **Monitoring for Performance Improvements:**

The report underscores the importance of continuously monitoring AI platforms to ensure ongoing performance improvements. This includes the collection of real-time data to identify areas where AI solutions may need adjustments or updates. Performance data is used to update algorithms, improving their efficiency and ensuring they remain aligned with operational goals.

- **Scalability Across Industries:**

The integration of scalable AI platforms is highlighted as a key driver of efficiency. For example, in finance, AI has transformed areas like risk management, fraud detection, and customer service automation. The study highlights that by scaling AI across different departments, organizations can benefit from more streamlined operations and better resource management.

6.12 Stanford AI Index Report 2024

- **Long-Term Sustainability and Continuous Learning:**

The Stanford AI Index Report notes that scalable AI platforms allow for continuous learning and improvement. These systems can be deployed rapidly across various sectors, enabling organizations to adapt to changing environments. Regular performance reviews and data-driven insights help ensure that AI systems remain sustainable and efficient over time.

Refer to AI Center of Excellence, Innovation Hub and Incubation Center Initiative in Appendix 3 (page 79) for further details on the strategic framework and its implementation.

6.13 Guidance Note on Big Data for Achievement of the 2030 Agenda

This UN Development Group handbook [19] provides guidelines for leveraging big data while maintaining high standards of privacy and ethical conduct. It emphasizes the need for data protection throughout all phases of data collection, processing, and dissemination, particularly in AI development. The handbook outlines best practices to ensure data privacy, security, and quality, aligning with sustainable development goals (SDGs) and ethical AI development.

Data Security Alignment with Ethical Standards:
The handbook stresses the alignment of data security practices with ethical standards, especially during AI development. AI projects often utilize large datasets, and it's crucial to implement safeguards that protect privacy while ensuring data integrity and security. Ethical AI development frameworks should ensure that data protection is embedded throughout all phases of the AI lifecycle, from data collection to model deployment.

- AI-Specific Security Standards: The handbook emphasizes the need for sector-specific security standards tailored to AI applications. These standards must be defined to ensure data is securely processed and safeguarded, minimizing the risks of data breaches or misuse. This is especially important when dealing with sensitive data in sectors like healthcare or finance, where privacy breaches can have significant consequences.

Consistency in Data Security Policies:
The handbook also advocates for the development of consistent data security policies. Many organizations may have basic security policies, but the handbook highlights the importance of ensuring these policies are comprehensive, standardized, and applied consistently across all departments involved in AI development. This helps create a cohesive security environment and ensures that all stakeholders follow the same guidelines.

- Publishing Data Security Policies: For data security practices to be effective, the handbook recommends publishing these policies clearly so that all departments are aligned with the organization's security system. When policies are transparent and accessible, it becomes easier for departments to coordinate their efforts, ensuring that data protection is enforced uniformly.

Ongoing Reference and Updates:
The handbook stresses the importance of continually updating data security policies in response to emerging trends. With AI technologies evolving rapidly, data security practices must remain agile, adjusting to new risks and challenges. The handbook advises organizations to periodically review and update their policies to ensure they remain relevant in an ever-changing technological landscape.

Use of Big Data and AI for Sustainable Development:
Another critical aspect of the handbook is its focus on leveraging big data for achieving sustainable development goals (SDGs). While AI plays a significant role in driving innovation, it is essential that data is managed responsibly. The handbook outlines best practices for data quality assurance, ethical use of data, and maintaining security to ensure that AI solutions contribute positively to global development efforts.

Refer to the AI Innovation sandbox for development in Appendix 3 (page 78) for further details on the strategic framework and its implementation.

6.14 Data Protection and Privacy for Developers of Artificial Intelligence (AI) in India

The Handbook on Data Protection and Privacy for Developers of Artificial Intelligence (AI) in India [20] provides practical guidelines for responsible AI development. It emphasizes integrating ethical and privacy considerations at every stage of the AI development lifecycle—pre-processing, in-processing, and post-processing. Key areas include data protection, algorithmic transparency, bias mitigation, and ensuring accountability. The document encourages developers to embed legal frameworks and ethical principles from design to deployment, addressing concerns around data privacy, security, and fairness.

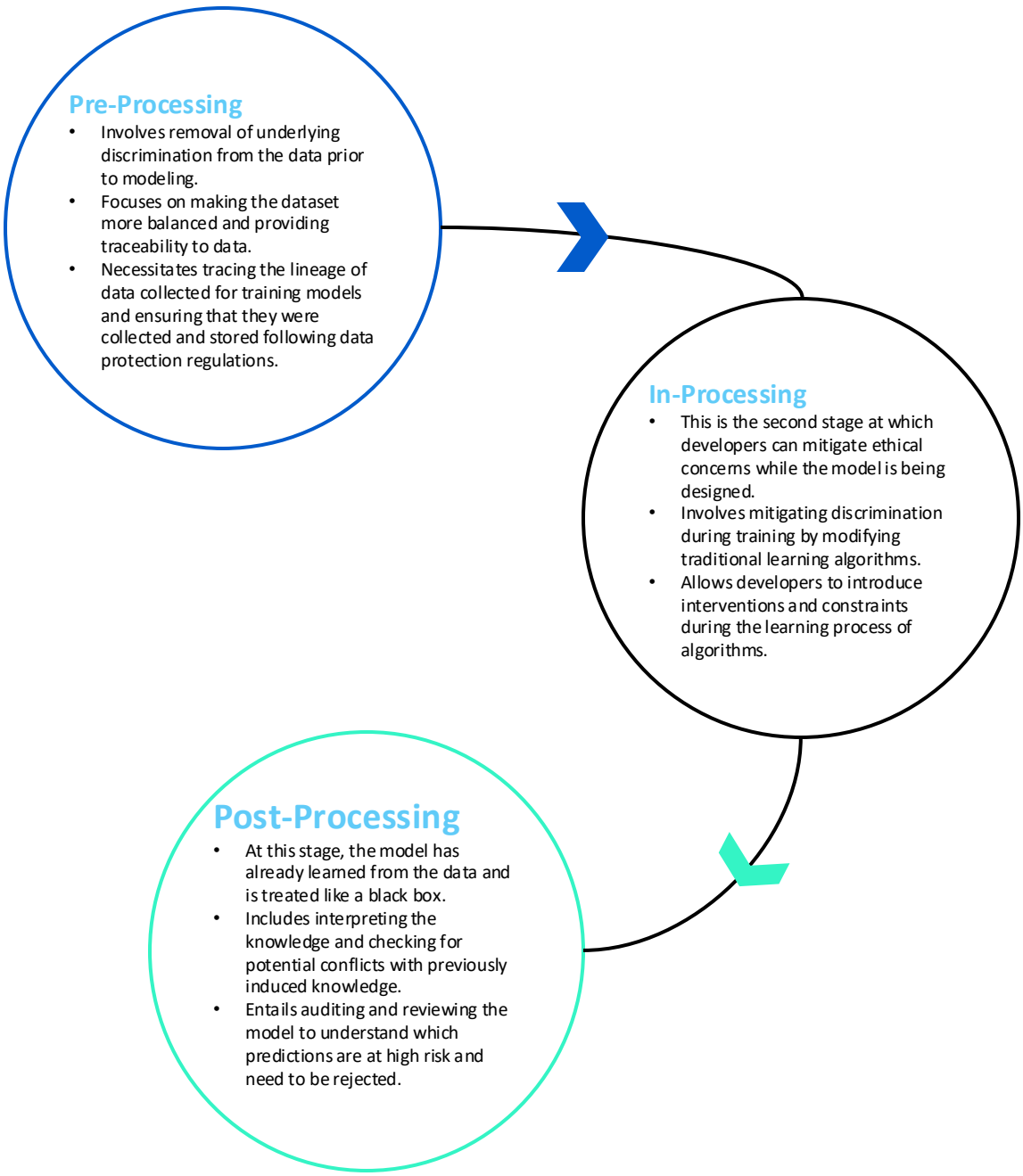


Figure 23 : Stages of Intervention

6.14 Data Protection and Privacy for Developers of Artificial Intelligence (AI) in India

Key Practices are:

- ✓ Data Traceability: Ensure datasets are traceable to uphold ethical standards, confirming data is collected legally and responsibly.
- ✓ Encryption and Anonymization: Protect personal information through encryption and anonymization techniques to prevent unauthorized access.
- ✓ Informed Consent: Obtain explicit consent from individuals whose data is being used for AI purposes, ensuring transparency.
- ✓ Bias Mitigation: Regularly audit datasets for biases to promote fairness in AI outcomes.
- ✓ Regular Audits: Conduct audits post-deployment to evaluate adherence to data protection regulations and security measures.

Refer the National data program initiative in Appendix 3 (page 86) for further details on the strategic framework and its implementation.

6.15 UNICEF Data Quality Framework

The UNICEF Data Quality Framework [21]provides a comprehensive structure for assessing and improving the organization of data across various sectors. Here are key points related to data quality and organization relevant to the question of how well data is structured within the country:

Key Components of Data Quality:

1. Quality Dimensions: The framework identifies various dimensions of data quality, including accessibility, output quality, process quality, and institutional quality. Each dimension contributes to ensuring that data is well-organized and fit for use.

2. Accessibility: Accessibility refers to how easily data can be discovered and accessed. The framework emphasizes the need for suitable formats, availability of metadata, and user support services to enhance data discoverability across sectors.

3. Output Quality: This dimension assesses whether data accurately measures what it claims. Key aspects include:

- Relevance: The data should meet the needs of stakeholders.
- Accuracy: Data must be precise and reliable.
- Timeliness: Data should be updated frequently to remain relevant.

4. Process Quality: Process quality ensures that the methods used to collect and handle data are sound. This includes having clear protocols for data collection, handling, and analysis to minimize errors and improve overall quality.

5. Institutional Quality: This aspect focuses on the organization's credibility and transparency in data handling. Trust in data is essential for users to rely on its quality.

Strategies for Improvements:

- Identifying Gaps and Errors: Regular assessments should be conducted to identify major gaps and errors within existing datasets. Organizations should implement data cleaning and structuring initiatives to rectify these issues.
- Structured Data Validation: Data validation processes should be robust, addressing any identified gaps and minimizing errors. This requires organizations to establish standardized procedures for data quality assurance.
- Continuous Improvement: Organizations must commit to continuously reviewing and improving their data organization practices. This includes aligning with best practices as outlined in frameworks like the UNICEF Data Quality Framework.

Refer the National AI workbench for collaborative research, development, and innovation and National Data Program Initiative in Appendix 3 (page 80 and 86) for further details on the strategic framework and its implementation.

6.16 The Startup India Initiative

The Startup India Initiative [22] provides robust government support to nurture entrepreneurship across sectors, including AI. It offers financial aid, mentorship, incubator programs, and tax benefits to drive innovation. Programs like the Startup India Seed Fund Scheme and TIDE 2.0 are designed to support tech startups, including AI-focused ventures, fostering growth across the country.

The support is given in these ways:

- The Startup India Initiative has established multiple programs supporting entrepreneurship, including AI startups. Initiatives such as Startup India Seed Fund Scheme offer early-stage funding to AI-driven startups.
- The Atal Innovation Mission (AIM) under Startup India includes several pilot programs aimed at innovation. While full-scale implementation for AI may still be limited in some cases, these early-stage programs are fostering innovation in the AI space.
- TIDE 2.0, a part of Startup India, supports small-scale tech startups, including AI initiatives. This program provides sector-specific support, targeting IT and AI ventures with financial aid and incubation facilities.
- The Startup India Initiative spans multiple sectors, offering resources, mentorship, and funding through incubators and accelerators. The initiative supports AI-driven entrepreneurship through broad schemes like the National Initiative for Developing and Harnessing Innovations (NIDHI) and AIM.
- Startup India has demonstrated strong results in supporting AI startups through its various schemes. Programs like Startup India Seed Fund Scheme and NIDHI have helped entrepreneurs scale their AI-focused ventures, promoting continuous improvement and impact assessment through structured feedback mechanisms.

Refer to AI Public Procurement Program for Startups initiative and AI Startup Accelerator Programs Initiative in Appendix 3 (page 81 and 89) for further details on the strategic framework and its implementation.

6.17 AI Public-Private Partnerships

Globally, public-private collaborations are essential in advancing AI research, development, and deployment. Countries like the United States, Singapore, and the United Kingdom have established significant initiatives that bring together government agencies and private companies to accelerate AI innovation, support startups, and address national challenges.

- **United States:** The National Artificial Intelligence Research Resource (NAIRR) Pilot Program is a key public-private initiative in the U.S., launched by the National Science Foundation (NSF). This program is designed to democratize access to AI resources by providing researchers, including those from small businesses and academia, with the computational tools, data, and software necessary for advancing AI research. It represents a collaboration between federal agencies and private sector partners aimed at creating a shared infrastructure for responsible and trustworthy AI innovation.
- **Singapore:** In Singapore, the Ignition AI Accelerator is a significant collaboration between Tribe, NVIDIA, and Digital Industry Singapore (DISG). This accelerator aims to nurture AI startups by providing them with resources such as technical expertise, cloud credits, and funding opportunities. The program is structured to help startups scale their AI solutions quickly and tap into global markets. It is part of Singapore's broader efforts to position itself as a global AI hub, capitalizing on its strong infrastructure and growing AI market.
- **United Kingdom:** The AI Sector Deal in the UK highlights the country's commitment to advancing AI through public-private partnerships. This initiative focuses on fostering collaboration between the government and private companies to support AI research and the development of AI solutions across various sectors, including healthcare and finance. The AI Sector Deal has facilitated significant investments in AI, ensuring the UK remains competitive in the global AI landscape initiatives underscore the importance of structured public-private collaborations in driving AI innovation. By pooling resources, expertise, and infrastructure, these countries are accelerating the development and deployment of AI technologies, fostering a dynamic ecosystem that benefits both the public and private sectors.

Please look into these links if you need more details : Link 1, Link 2, Link 3, Link 4.

Refer to AI Center of Excellence, Innovation Hub and Incubation Center on Page 79

6.18 Global Partnership on AI (GPAI)

The Global Partnership on AI (GPAI) [23] is an international initiative that brings together governments, industry experts, and academia to collaborate on AI development. With over 25 member countries, GPAI aims to foster responsible AI usage through cross-border projects focusing on areas like ethics, data governance, and the future of work. Key initiatives include AI's role in sustainable development, healthcare, and pandemic response. GPAI emphasizes global collaboration to tackle AI challenges by sharing knowledge and best practices across sectors and regions.

Key Focus Areas:

- AI Ethics and Governance: GPAI actively works on developing ethical frameworks that ensure responsible AI deployment.
- Global AI Projects: Its working groups engage in real-world projects like AI for pandemic response, future of work studies, and sustainable development solutions.
- International Collaboration: GPAI facilitates collaboration across countries and sectors, ensuring that AI technologies and policies are harmonized globally.

Global Knowledge Sharing:

The partnership enables international cooperation, allowing countries to share best practices and innovations in AI. By fostering a cross-sectoral dialogue, GPAI ensures that nations align on ethical frameworks for AI development, balancing innovation with the need for fairness and transparency in AI deployment. Its collaborative model ensures continuous feedback and improvement, aligning AI research with national priorities and global goals.

Examples of Events:

- As the lead chair for 2024, India has spearheaded numerous GPAI initiatives. One of the key highlights is the recently concluded Global IndiaAI Summit, 2024, held at Bharat Mandapam in New Delhi, which hosted the convening on Global Health and AI. This event provided an essential platform for the key stakeholders from industry organizations, start - ups, academia, civil society, and government organizations working at the intersection of AI and healthcare. The objective of the convening was to engage in deep discussions, brainstorm solutions, and contemplate the specific challenges and opportunities of integrating AI into healthcare, especially within the context of the Global South.
- The convening was a follow-up to an earlier domestic consultation which underscored the importance of understanding local realities and contexts in the deployment of AI solutions in healthcare. The domestic consultation shed light on specific challenges and opportunities at the local level, setting a foundational stage for broader discussions. The convening at the Global IndiaAI Summit, 2024, elevated this dialogue to a global scale, with a particular focus on the challenges and opportunities unique to the Global South. Together, these sessions delved into how AI technologies could be effectively integrated into health systems worldwide while being attuned to local nuances

Refer to AI Professional Special Visa Program for attracting talent Initiative in Appendix 3 (page 88) for further details on the strategic framework and its implementation.

6.19 Turning AI Fellowships

The Turing AI Fellowships [24] represent a major initiative by the UK government to support AI research and promote international collaboration in the AI sector. Launched to build a globally competitive AI ecosystem, the fellowships provide significant financial support, mentorship, and networking opportunities for researchers. The goal is to position the UK as a leader in AI by attracting top talent from across the world and fostering partnerships between academic institutions, industry, and government bodies.

Key Sectors Supported:

The fellowships are aimed at developing AI technologies in fields like:

- Healthcare: AI innovations that advance medical diagnostics, personalized healthcare, and treatment strategies are strongly encouraged. Research in AI-driven medical tools can enhance the healthcare system's efficiency and patient outcomes.
- Environmental Science: AI applications for climate change and sustainability are another focus area, with fellows working on projects that use AI to monitor environmental changes, optimize resource use, and develop predictive models for climate science.
- Finance & Business: In the finance sector, AI research focuses on areas like fraud detection, automated decision-making, and risk assessment, improving the efficiency and security of financial services.

Cross-Border Knowledge Sharing:

One of the main goals of the Turing AI Fellowships is to promote cross-border collaboration by facilitating international exchanges and knowledge sharing between researchers in academia and industry. This collaboration allows AI talent from different countries to contribute to shared goals and work on solutions to common global challenges. The fellowships are integrated into the UK's broader AI strategy and provide continuous support for research that addresses both local and international AI challenges.

Program Impact:

The fellowships play a crucial role in the global AI ecosystem by supporting long-term research and innovation. By fostering international partnerships, the fellowships help bring new AI applications to market, ensuring the UK remains at the forefront of AI research. The program includes regular assessments and feedback mechanisms to ensure that AI research is aligned with evolving global trends, making the Turing AI Fellowships a cornerstone of the UK's AI leadership strategy.

Refer to AI Talent Exchange and Global Fellowships Initiative in Appendix 4 (page 83) for further details on the strategic framework and its implementation.

6.20 AI and Return on Investment (ROI)

The article [25] shows the government's approach to prioritizing investments in AI and measuring the return on investment (ROI) is evolving. The process involves defining strategic areas for AI deployment, evaluating the impact across different sectors, and establishing frameworks to track performance and benefits. Measurement of ROI is not always straightforward and varies across sectors, but it increasingly includes financial gains, operational efficiencies, and broader societal improvements.

Government Prioritization of AI Investments Governments prioritize AI investments by identifying key sectors where AI can provide transformative benefits. Common areas include healthcare, education, public safety, infrastructure, and public administration. In these sectors, AI can improve efficiency, streamline processes, and enhance decision-making. AI investment often aligns with national strategies, digital transformation goals, and economic growth agendas.

When making decisions on prioritization, governments typically focus on areas that offer both immediate operational improvements and long-term societal impact. Early investments may be exploratory, involving pilot programs to test AI capabilities, particularly in public services, where efficiency and service delivery improvements are central.

ROI Measurement in AI Investments Unlike traditional investments, measuring ROI for AI is complex because AI delivers not just financial returns but also societal value. Standard ROI metrics may not capture the full spectrum of benefits that AI can bring to public services, such as increased citizen satisfaction, improved safety, or access to better healthcare. Governments, therefore, need to adopt a broader approach to ROI measurement that encompasses both quantitative and qualitative impacts.

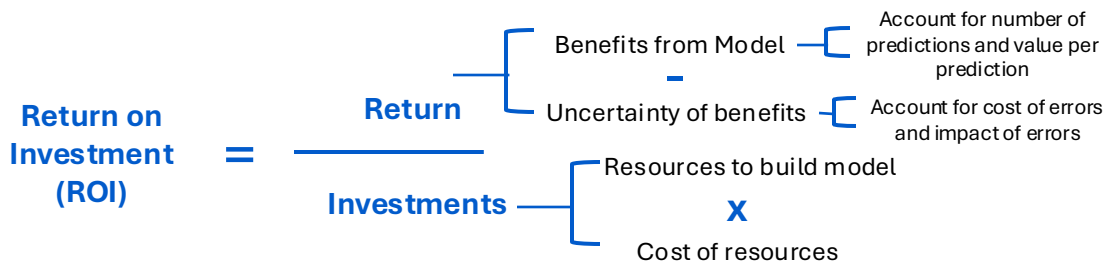


Figure 24: ROI Equation

6.20 AI and Return on Investment (ROI)

Key metrics for ROI in AI investment could include:

- Operational efficiency: Reductions in time, cost, or errors in processes such as public service delivery, data management, or citizen engagement.
- Cost savings: Savings generated by automating manual tasks, improving infrastructure management, or optimizing resource allocation.
- Service quality improvements: Enhanced quality of public services, such as faster healthcare diagnostics, more responsive government platforms, or improved education outcomes.
- Public satisfaction and trust: Increased satisfaction from citizens who experience more streamlined and effective government services.

The measurement approach is often sector-specific. In healthcare, for instance, ROI might be measured through better patient outcomes and reduced healthcare delivery costs. In education, it could involve improved learning outcomes, better access to personalized learning, and operational savings.

Sector-Specific ROI Measurement Each sector where AI is deployed has unique ROI considerations:

- Healthcare: The ROI might include reduced diagnostic errors, faster service delivery, and better patient outcomes, which could also lower healthcare costs.
- Education: AI in education may enhance learning through personalized platforms, helping students achieve better academic results while potentially reducing teaching costs through automation.
- Public Administration: Efficiency gains, such as processing times for permits or optimizing city planning and public services, represent tangible ROI in administrative tasks.

6.21 ISO/IEC 5259-1:2024

ISO/IEC 5259-1:2024 [26]provides a comprehensive framework for ensuring data quality in analytics and machine learning (ML). The standard outlines the key attributes and processes necessary for managing and improving the quality of datasets used for AI model training and deployment. It emphasizes the importance of structured, high-quality data that is consistent, labeled, and free of bias, aligning with best practices for AI development.

Availability of High-Quality Datasets for AI Model Training

Ensuring the availability of structured, high-quality datasets is critical for successful AI model training and deployment. According to ISO/IEC 5259-1:2024, data quality directly impacts the performance and reliability of analytics and ML systems. The standard highlights the following key considerations for high-quality data:

1. **Data Quality Management:** Structured processes should be in place to manage the quality of data throughout its lifecycle, from collection to storage and use. This includes ensuring that data is accurate, complete, consistent, and relevant for the intended AI application.

2. **Data Governance**: Establishing robust data governance practices is essential for maintaining control over data assets and ensuring data quality across all stages. This involves defining roles and responsibilities for data management and implementing measures to track and improve data quality.

3. **Data Provenance and Lifecycle:** High-quality datasets must include metadata that tracks data provenance, detailing its origin, collection process, and any transformations. Understanding the history of the dataset ensures that it can be trusted for training AI models. The standard also emphasizes the need for continuous data updates to maintain relevance.

4. **Data Labeling and Curation:** For supervised learning, labeled data is essential. ISO/IEC 5259-1 stresses the importance of clean and well-labeled datasets, where the features of each data point are clearly defined and categorized. This improves the accuracy of AI models by reducing ambiguity during training.

5. **Bias Mitigation:** Ensuring that datasets are free from bias is crucial for fairness and reliability in AI applications. ISO/IEC 5259-1:2024 outlines the need for regular reviews and audits of datasets to identify and address any potential biases that may affect model outcomes.

In line with ISO/IEC 5259-1:2024, organizations should aim to provide datasets that are not only structured and high-quality but also fully aligned with international data quality standards. This alignment helps guarantee that AI models trained on these datasets can perform effectively and generate accurate predictions.

By adhering to these principles, organizations can ensure that the datasets used for AI model training and deployment meet the highest standards of quality, allowing for more accurate, reliable, and unbiased AI systems.

Refer the National data program initiative in Appendix 3 (page 86) for further details on the strategic framework and its implementation.

6.21 ISO/IEC 23894:2023

The ISO/IEC 23894:2023 [27] provides guidance on risk management for organizations developing, deploying, or using AI systems. It emphasizes the need for an integrated and structured risk management approach, addressing challenges such as scaling, security, and transparency. The standard outlines how organizations should manage risks associated with AI, ensuring that AI systems are deployed responsibly and securely.

Technology Infrastructure Maturity for AI Solutions

To effectively support AI solutions, organizations must develop a robust technology infrastructure that enables automation, development, deployment, scaling, and monitoring. The ISO/IEC 23894:2023 provides key guidelines for managing risks associated with AI systems, which can be aligned with infrastructure maturity goals.

1. **Risk Management for AI Infrastructure:** Organizations should adopt a structured and comprehensive risk management framework, as outlined in ISO/IEC 23894. This ensures that all potential risks related to AI deployment, such as scalability and security, are identified and addressed. The framework integrates risk management into the broader activities of AI system development and operations.

2. **Integration and Scaling Capabilities:** A mature infrastructure should enable automated scaling and continuous monitoring of AI systems. ISO/IEC 23894 stresses the importance of dynamic risk management, as AI systems are continuously evolving and require regular adjustments to infrastructure to accommodate scaling demands. The infrastructure should support AI's iterative development and deployment cycles.

3. **Security and Monitoring:** Ensuring secure deployment and monitoring of AI systems is crucial for maintaining trust and accountability. ISO/IEC 23894 highlights the need for continuous monitoring of AI systems to identify emerging risks, such as security vulnerabilities or performance degradations. Implementing strong security protocols, combined with real-time monitoring, will ensure that AI solutions remain reliable and effective at scale.

4. **Alignment with ISO/IEC 23894:** By aligning infrastructure development with the principles outlined in ISO/IEC 23894, organizations can optimize their infrastructure for scalability, security, and automation. This includes integrating best practices for risk management throughout the AI lifecycle, ensuring that infrastructure is continuously updated to meet evolving needs.

In conclusion, a mature AI infrastructure should not only support the scaling and deployment of AI solutions but also incorporate continuous monitoring and risk management practices to ensure security and efficiency. The guidelines in ISO/IEC 23894:2023 provide a solid framework for achieving this level of maturity.

6.22 Visual Capitalist Statistics

The resource [28] shows that the number of AI-focused startups has been increasing globally, with leading countries like the United States and China dominating the field. Tracking the percentage of AI startups compared to the total number of startups offers valuable insights into the growth of AI innovation within a nation's tech ecosystem. The proportion of AI startups is a critical metric in understanding how deeply AI is integrated into the broader entrepreneurial landscape.

AI Startup Ecosystem and Growth Proportion

From 2013 to 2023, the global AI startup ecosystem saw rapid expansion, with the United States leading the charge, hosting 5,509 AI startups, and China following with 1,446 startups. The U.S. attracted a total of $335 billion in private investment in AI over this period, whereas China secured $104 billion. The UK, with 727 startups, and Canada, with 397 startups, are also seeing steady growth in their AI ecosystems.

When evaluating the maturity of a country's AI startup landscape, it's essential to track the percentage of AI startups relative to the total number of startups:

- Countries like the U.S. and China exhibit a high percentage of AI-focused startups within their broader tech ecosystems.
- AI-driven sectors such as AI infrastructure, natural language processing, and data management attracted substantial investments in 2023, further fueling AI startup growth. For instance, $18.3 billion was invested globally in AI infrastructure alone.

This data helps to analyze how AI startups are shaping a country's innovation landscape and gauge how closely aligned the startup ecosystem is with global AI trends.

Refer to AI Startup Accelerator Programs Initiative in Appendix 3 (page 89) for further details on the strategic framework and its implementation.

6.23 AI Certifications by the Government

- The Artificial Intelligence Program, managed by the UAE's National Program for Artificial Intelligence and facilitated by the University of Birmingham, provides specialized training in AI and generative AI. It covers AI challenges, opportunities, security, and ethical concerns while offering insights into global AI trends, especially in Large Language Models. Aimed at government officials, private sector employees, and UAE residents, the program helps participants develop expertise in AI adoption and risk management. The goal is to support the UAE's 2071 vision by empowering professionals with advanced AI knowledge and skills.

  The UAE's National AI Program offers several specialized certifications, such as:
  - **AI Training for Government**: Aimed at government employees, focusing on integrating AI into public services. [29]
  - **AI and Generative AI Certification**: A four-module course in partnership with the University of Birmingham, including ethics, security, and real-world applications [29].

- AI Singapore offers specialized training programs to enhance AI skills across industries. Programs like **"AI for Everyone" (AI4E)"** [30] introduce basic AI concepts to the general public, while **"AI for Industry" (AI4I)** [31] targets professionals with practical AI knowledge for workplace applications. For those seeking advanced experience, the **AI Apprenticeship Program (AIAP)** [32] provides hands-on training through real-world AI projects. These programs aim to build AI talent in Singapore, equipping participants with the tools to tackle AI adoption, ethical considerations, and practical uses in diverse sectors.

Refer to AI Training, Certification, and Upskilling Programs initiative in Appendix 3 (page 85) for further details on the strategic framework and its implementation.

6.24 List of AI events such as community meetups, conferences, hackathons, and workshops

Government	AI Event
United States	Annual AI conferences (e.g., AI World Government) [33], hackathons (e.g., NASA Space Apps Challenge) [34] , AI workshops (e.g., NIST AI community workshops) [35].
United Kingdom	AI conferences (e.g., CogX [36], AI UK by The Alan Turing Institute), AI workshops, and meetups supported by government agencies.
Canada	AI workshops (e.g., CIFAR AI workshops), hackathons, AI community meetups (e.g., Toronto AI meetup).
Singapore	AI Singapore [37] runs hackathons, meetups, and workshops under the AI Apprenticeship Programme (AIAP) and AI for Everyone (AI4E) initiatives.
India	AI conferences (e.g., RAISE), AI hackathons, and AI workshops led by NITI Aayog [38] and government initiatives.
China	Annual AI conferences (e.g., World Artificial Intelligence Conference) [39], hackathons, and workshops promoted by the Chinese government.
United Arab Emirates	AI hackathons (e.g., AI Everything Hack) [40], AI conferences (e.g., AI Everything), and government-led AI workshops.
Germany	AI community workshops and AI meetups supported by government agencies and AI-focused events (e.g., AI Camp) [41].
Japan	AI-related conferences (e.g., International Conference on Artificial Intelligence and Robotics), hackathons, and government-sponsored workshops.
France	AI hackathons (e.g., HackAI) [42] , workshops, and conferences supported by government AI initiatives such as AI for Humanity.

Refer to AI Visiting Professorship initiative in Appendix 3 (page 82) for further details on the strategic framework and its implementation.

6.25 Financial Investment from the Public and Private Sectors in Joint AI Initiatives

In terms of **financial investment from the public and private sectors in joint AI initiatives** and its role in promoting **AI adoption across the country**, both **SMART Africa** and **ECOWAS** are notable examples of how investment in AI is evolving across the African continent.

SMART Africa:

- **Public-Private Investment in AI**: SMART Africa has seen a rise in public-private partnerships aimed at fostering AI adoption across African nations. Member states are investing in digital infrastructure, broadband access, and technological platforms to create a fertile ground for AI applications. For instance, Rwanda, one of the founding members, has made significant public sector investments in AI-driven projects, and international tech companies like Microsoft and IBM have partnered with SMART Africa on AI projects, offering investment and technical support.
- **AI Projects and Economic Development**: Investments are directed toward AI applications in key sectors such as **education, healthcare, agriculture**, and **e-governance**. The SMART Africa initiative focuses on creating an AI-friendly ecosystem through funding innovation hubs, providing AI literacy programs, and implementing AI for sustainable development projects. Public funds and private investments, including funding from development partners like the World Bank, are also key drivers in this initiative.
- **Impact on AI Adoption**: By promoting collaboration between governments, private firms, and international organizations, these investments have catalyzed the adoption of AI technologies across the continent. The vision of creating a **single digital market** through SMART Africa highlights how these joint financial efforts are directly tied to AI-driven economic and societal growth.

ECOWAS:

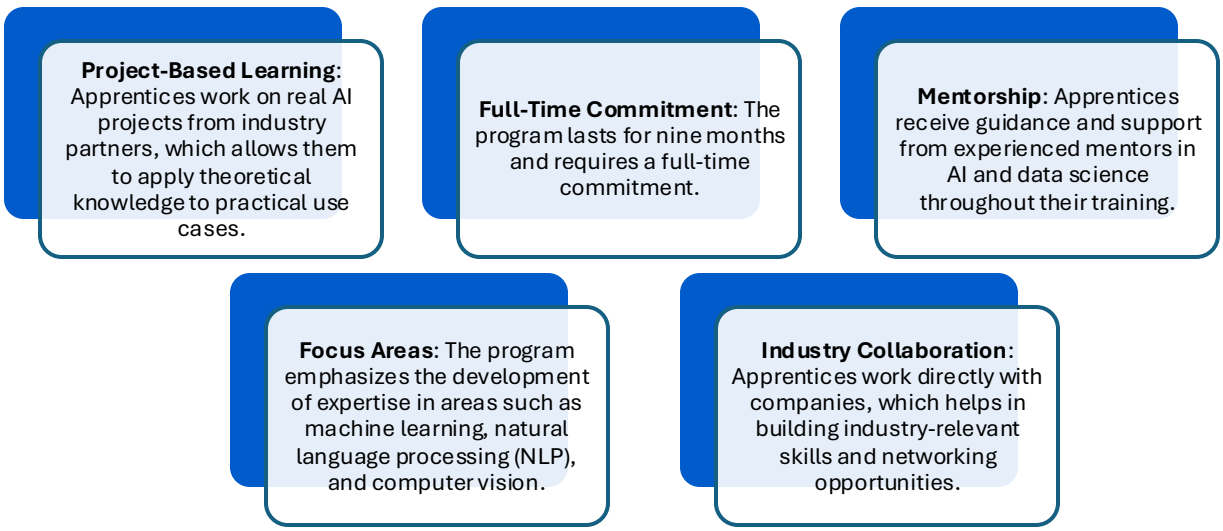
- **Financial Investments in AI**: ECOWAS countries are also witnessing a shift in how both the public and private sectors are financing AI initiatives. Countries like Nigeria and Ghana, part of ECOWAS, have seen investments from the government and tech firms into AI-focused startups and innovation hubs. Nigeria, for example, is establishing tech hubs and AI labs, while international firms like Google and Facebook have invested in local AI startups.
- **Public Sector AI Strategies**: ECOWAS member countries are adopting national AI strategies, with significant public funding to drive AI innovations. These strategies often focus on improving **infrastructure, training, and AI literacy**, with collaboration from international bodies that provide additional funding.
- **Private Sector Role**: Private sector investments have increasingly complemented these public efforts. Tech companies are investing in AI-related research and development, while venture capitalists are funding AI startups working on solutions for sectors like **financial services (Fintech), agriculture, and education**. This has accelerated the pace of AI adoption across West Africa, as governments align their policies with private sector innovations.

Evolution of Joint Financial Investments:

The **evolution of financial investments** from both the public and private sectors in these AI initiatives reflects a growing recognition of the role AI can play in transforming African economies. Governments are providing the necessary policy frameworks and infrastructure investment, while the private sector brings innovation, technical expertise, and funding to scale AI initiatives. These collaborations are proving essential in promoting widespread **AI adoption** in various industries and fostering a robust digital economy across the region.

6.26 Singapore's AI Apprenticeship Program (AIAP)

Singapore's **AI Apprenticeship Program (AIAP)** is an initiative by AI Singapore, designed to cultivate AI talent and bridge the gap between academic learning and industry needs. This program focuses on equipping apprentices with practical AI and machine learning skills through real-world projects. As part of AI Singapore's initiative, AIAP is a public-private partnership that facilitates skill development. Apprentices in this program work on real industry projects, collaborating with private companies, thereby transferring knowledge from industry to apprentices who often come from academic or public sector backgrounds. This builds a bridge between the public and private sectors.
Key highlights of the program include:



This apprenticeship program is one of Singapore's key efforts to address the growing demand for AI talent and ensure that local professionals are well-equipped for the digital economy.

Refer to AI Training, Certification, and Upskilling Programs initiative in Appendix 3 (page 85) for further details on the strategic framework and its implementation.

Appendix 7
AI Adoption Pillars

AI Adoption Pillars

The literature review synthesizes AI readiness frameworks from leading sources like Tortoise, Oxford Insights, UNESCO, Salesforce, and Capgemini. It highlights key pillars such as Talent, Infrastructure, Development, and Government Strategy, emphasizing diverse approaches to AI maturity, human capital, and digital governance across these frameworks.

Literature Review				
Tortoise	**Oxford Insights**	**UNESCO**	**Salesforce**	**AI Readiness Benchmark** by Capgemini
Talent	Human Capital	AI Education	Human Capital Knowledge & Technology	Education
Infrastructure	Infrastructure Data Availability Data Representativeness	Infrastructure & Connectivity Computing Capabilities	Digital Readiness	IT Maturity & Advancements
Development	Innovation Capacity Maturity	Innovation Output	-	IT Developments
Government Strategy	Governance & Ethics Digital Capacity Adaptability Vision	AI Policy & Regulations	Digital Government	Policies & Regulations
Operating Environment	-	Health & Well-Being Culture	-	-
Research	-	Research Output Ethical AI Research	Research	Research
Commercial	-	Investments Consumption Labor Markets	AI Start-ups Investments	-

The table presents a comparison of AI readiness factors from a literature review, benchmarking AI champions, and identifying common dimensions, aligning them with strategic pillars. These pillars, such as "Strategy, Policies & Regulations Formulation" and "Enable R&D and Innovation," reflect essential focus areas to support comprehensive AI development and adoption.

Literature Review	Benchmarking AI Champion Countries	Common & Important Dimensions	Pillars
AI Policies and Regulations	AI Policies	**Strategy**	Strategy, Policies & Regulations Formulation
Government Strategy	Governance	**Policies & Regulations**	
Governance and Ethics	AI Ethics	**AI Governance & Ethics**	
Innovation Capacity & Innovation Output	Innovation	**Innovation**	Enable R&D and Innovation
Research Output	Research & Development	**Research & Development**	
IT Maturity & Advancements	Deployment	**AI Deployment & Integration**	
Data Availability	Data Availability	**Data Availability**	Data Economy
Governance & Ethics	Data Management and Data Protection	**Data Management & Protection**	
Data Representativeness	Data Quality	**Data Quality**	
AI Start-ups/ Investments	Public-Private Partnerships	**Public-Private Partnerships**	
Infrastructure	Cloud Infrastructure	**Infrastructure**	Technology Infrastructure Enhancement
AI Start-ups	Entrepreneurship	**Entrepreneurship**	**Incentivize AI Uptake**
Investments/ Education	International Collaborations	**International Collaborations**	
Investments	Investments in AI	**Investments**	
Talent	AI Education & Training Program	**AI Education & Training Program**	Education, Awareness & Skill Development
Education	Continuous Learning and Skill Development	**Continuous Learning and Skill Development**	

Appendix 8
List of Abbreviations & Glossary

4.8.1 List of Abbreviations

Abbreviation	Full Form
AI	Artificial Intelligence
AI Act	Artificial Intelligence Act (related to EU regulatory frameworks)
AI CoE	Artificial Intelligence Center of Excellence
AI Data Ecosystem	Artificial Intelligence Data Ecosystem
AI Ethics Board	Artificial Intelligence Ethics Board
GDPR	General Data Protection Regulation (specific to the European Union, it governs data protection and privacy)
AI Innovation Hub	Artificial Intelligence Innovation Hub
AI Labs	Artificial Intelligence Laboratories
AI National Strategy	Artificial Intelligence National Strategy
AI R&D	Artificial Intelligence Research and Development
AI Sandbox	Artificial Intelligence Regulatory Sandbox
API	Application Programming Interface
CE	Conformité Européenne (European Conformity)
DAMA-DMBOK	Data Management Association - Data Management Body of Knowledge
DCO	Digital Cooperation Organization
EU	European Union
GDP	Gross Domestic Product
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
ISO	International Organization for Standardization
KPI	Key Performance Indicator
LLM	Large Language Model
ML	Machine Learning
NLP	Natural Language Processing
OECD	Organisation for Economic Co-operation and Development
PETs	Privacy Enhancing Technologies
PoC	Proof of Concept
PPP	Public-Private Partnerships
R&D	Research and Development
RLAIF	Reinforcement Learning from AI Feedback
SME	Small and Medium-sized Enterprises
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UN	United Nations
WEF	World Economic Forum
AI EU Office	Artificial Intelligence European Union Office

4.8.2 Glossary

Term	Definition
AI Adoption Framework	A structured guide for nations to adopt and integrate AI across sectors, driving innovation, economic growth, and responsible governance while mitigating risks.
AI Acceleration Framework	A framework to expedite AI development through innovation hubs, public-private partnerships, and AI-centered initiatives that accelerate growth across industries.
AI Ethics	A set of principles guiding the responsible development and use of AI, focusing on transparency, fairness, accountability, and reducing bias in AI applications.
AI Ecosystem	The collaborative environment of stakeholders (government, industry, academia, etc.) working together to foster AI development and deployment.
AI Governance	The system of rules, practices, and processes ensuring that AI technologies are used ethically, safely, and transparently, while complying with regulations and societal expectations.
AI Infrastructure	The foundational technology, resources, and systems (like cloud computing, supercomputers) necessary to support AI development and deployment.
AI Maturity	A measure of a country's readiness to adopt AI and integrate it into government, business, and society, from early stages of awareness to full-scale AI-driven innovation.
AI Policies and Regulations	National frameworks developed to oversee AI development, addressing ethical, legal, and societal implications of AI use, including data privacy and safety.
AI Research & Development (R&D)	Activities focused on advancing AI technologies and fostering innovation through research, public-private collaboration, and investment in AI capabilities.
AI Talent Development	Initiatives to develop skills and education programs that prepare the workforce for AI, ensuring the availability of skilled professionals to meet industry needs.
Data Economy	An economic system where data is considered a key asset for innovation, decision-making, and growth, supported by frameworks for data accessibility, governance, and security.
Data Governance	Policies and practices that ensure data integrity, security, quality, and responsible use, essential for effective AI deployment and minimizing risk.
Ethical AI Framework	A framework designed to ensure that AI systems are developed and deployed ethically, promoting fairness, accountability, transparency, and privacy.
Generative AI	A type of AI capable of generating new content such as text, images, or audio, often used in creative applications but also posing risks related to misinformation, bias, and intellectual property issues.
Human-Centric AI	AI that prioritizes human oversight, fairness, and explainability in its design and deployment, ensuring that AI systems align with societal values and ethical standards.
Incentives for AI Uptake	Government programs and initiatives designed to encourage AI adoption across industries, including funding, tax benefits, training, and support for startups.

4.8.2 Glossary

Term	Definition
Key Performance Indicators (KPIs)	Metrics used to measure the success of AI initiatives in areas such as economic growth, job creation, infrastructure development, and AI adoption rates.
Model AI Governance Framework	A governance structure that ensures AI systems are used ethically, safely, and transparently, often customized by nations to address specific local needs and international standards.
Model National AI Strategy	A comprehensive national plan for harnessing AI, focusing on areas like governance, innovation, talent development, infrastructure, and responsible AI deployment to achieve sustainable economic growth.
Open Data Platform	A platform facilitating access to large datasets for AI development, supporting innovation through data sharing while ensuring compliance with privacy and security regulations.
Public-Private Partnerships (PPP)	Collaborations between governments and private companies to promote AI research, innovation, and development, fostering shared initiatives and resource pooling.
Regulatory Sandbox	A controlled environment where businesses can test new AI technologies while complying with regulations, encouraging innovation and responsible AI development without full regulatory burden during early stages.
Responsible AI	AI developed and deployed in ways that promote fairness, safety, transparency, and accountability, ensuring societal benefits while minimizing risks.
Risk-Based Classification	A system for classifying AI applications by risk level (e.g., high-risk, limited risk, minimal risk) to guide appropriate levels of oversight and regulation, ensuring public safety and trust in AI systems.
SWOT Analysis	An analytical tool used to evaluate the Strengths, Weaknesses, Opportunities, and Threats in a country's AI ecosystem, helping shape strategies for AI adoption and growth.

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