ASEAN RESPONSIBLE AI ROADMAP (2025-2030)

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EXECUTIVE SUMMARY

BACKGROUND

The *ASEAN Responsible AI Roadmap (2025-2030)* (the Roadmap) is developed to provide actionable steps for ASEAN policymakers and stakeholders to create the ideal conditions for responsible AI to flourish in the region, as well as for AMS to leverage and enable responsible AI in a meaningful, impactful, and sustainable manner by 2030.

The Roadmap provides customized and step-by-step guidance for ASEAN governments to prioritize and operationalize responsible AI in an integrated and interoperable manner. It does this by providing tailored information on two main fronts: (1) foundational policy and regulatory factors that foster conducive and enabling environments for responsible AI to emerge in ASEAN; and (2) targeted actions, initiatives, and outcomes for a constructive and sustainable AI operationalization that takes AMS's specific needs, priorities, and capabilities into account.

As such, the Roadmap is envisioned as a consultative, participative, collaborative, and iterative endeavor, drawing from the feedback and input of a wide range of ASEAN experts and stakeholders.

To this end, it is important to note that the Roadmap is developed to complement and support ASEAN's ongoing work in AI governance—the upcoming *Guidelines on Responsible Development and Use of Generative AI in ASEAN*, as well as the *ASEAN Guide on AI Governance and Ethics*[1] and its key deliverables; including the launch of an AI risk impact assessment template, the development of an AI Governance framework for ASEAN, the creation of an ASEAN Working Group on AI Governance, and the provision of both national- and regional-level recommendations for ASEAN governments to design, develop, and deploy AI systems responsibly.

OBJECTIVES

Developed in line with the priorities set by the *ASEAN Digital Masterplan 2025*[2] and the provisions of the upcoming *ASEAN Digital Economy Framework Agreement (DEFA)*,[3] the *ASEAN Responsible AI Roadmap (2025-2030)* aims to:

- Support AMS in the development and adoption of a regionally concerted approach to responsible AI enablement and operationalization;
- Provide actionable steps for lawmakers, policymakers, and regulators in ASEAN to leverage responsible AI in a meaningful, inclusive, and sustainable manner by 2030;
- Empower AMS and ASEAN stakeholders to drive and operationalize responsible AI across the region in a way that fits each country's specific needs, priorities, and capabilities; and
- Facilitate the alignment of AMS' national AI efforts with ASEAN's broader digitalization commitments and initiatives such as those outlined in the DEFA.

THE ROADMAP

The development of the *ASEAN Responsible AI Roadmap (2025-2030)* is anchored on the foundational efforts undertaken in the earlier stages of this project. Specifically, the **Landscape Overview** and the **Benchmarking Framework** that were developed as part of the Research Brief on *Responsible AI in Southeast Asia*.[4] The Roadmap also leverages the national and regional-level recommendations from the *ASEAN Guide on AI Governance and Ethics*.[5]

[1] ASEAN (2024), ASEAN Guide on AI Governance and Ethics, https://asean.org/wp-content/uploads/2024/02/ASEAN-Guide-on-AI-Governance-and-Ethics_beautified_201223_v2.pdf
[2] ASEAN (2021) ASEAN Digital Masterplan 2025, https://asean.org/book/asean-digital-masterplan-2025
[3] ASEAN (2023) Framework for Negotiating ASEAN Digital Economy Framework Agreement, https://asean.org/wp-content/uploads/2023/09/Framework-for-Negotiating-DEFA_ENDORSED_23rd-AECC-for-uploading.pdf
[4] Access Partnership (2023) Responsible AI in Southeast Asia: Tracking Progress and Benchmarking Impact, https://accesspartnership.com/ai-in-sea
[5] ASEAN (2024), ASEAN Guide on AI Governance and Ethics, https://asean.org/wp-content/uploads/2024/02/ASEAN-Guide-on-AI-Governance-and-Ethics_beautified_201223_v2.pdf

Tables 1a and 1b below provide an overview of the key action areas across the tiered roadmaps and overall regional roadmap.

Table 1a. Overview of Key Cross-Cutting Action Areas of the *ASEAN Responsible AI Roadmap (2025-2030)*

CROSS-CUTTING ROADMAP – CROSS-CUTTING ACTIONS & PRIORITIES			
CROSS-CUTTING PILLAR 1: SKILLS & CAPACITY BUILDING	**CROSS-CUTTING PILLAR 2: FAIRNESS & INCLUSION**	**CROSS-CUTTING PILLAR 3: GOVERNANCE & PARTICIPATION**	**CROSS-CUTTING PILLAR 4: INTEGRATION & COOPERATION**
C1.1 Advance AI skill development across the ASEAN workforce C1.2 Enhance ASEAN public-sector capacities on AI C1.3 Strengthen the regional AI ecosystem through start-up incubation and strategic partnerships C1.4 Advance the AI research and innovation ecosystem in ASEAN C1.5 Advance the development and accessibility of digital infrastructure and connectivity for AI	C2.1 Launch regional initiatives to promote inclusive community engagement and participation on AI C2.2 Incentivize inclusive design and testing of AI systems/platforms C2.3 Raise awareness of AI risks and challenges in general and for vulnerable communities	C3.1 Develop secure and trusted data-sharing platforms to enable interoperable AI systems C3.2 Enhance and advance multi-stakeholder dialogue on AI governance C3.3 Continuously review and enhance the Roadmap and ensure its implementation is aligned with the *ASEAN Guide on AI Governance and Ethics* and the *ASEAN Digital Economy Framework Agreement (DEFA)*	C4.1 Advance regional capacity-building and knowledge-sharing C4.2 Multiply cross-border collaboration initiatives on AI and AI governance C4.3 Sustain global engagement and collaboration for responsible AI C4.4 Actively facilitate/participate in regional forums and initiatives on AI governance

Source: Access Partnership

Table 1b. Overview of Key Targeted Action Areas of the *ASEAN Responsible AI Roadmap (2025-2030)*

	TARGETED ROADMAP – TARGETED ACTIONS & PRIORITIES			
	TARGETED PILLAR 1: INTERNAL GOVERNANCE STRUCTURES AND MEASURES	**TARGETED PILLAR 2: SKILLS & KNOWLEDGE FOR RESPONSIBLE, AI-AUGMENTED DECISION-MAKING**	**TARGETED PILLAR 3: RISK MITIGATION, MONITORING MECHANISMS, AND OPERATIONS MANAGEMENT**	**TARGETED PILLAR 4: STAKEHOLDER COORDINATION & REGIONAL COOPERATION ON AI**
ADVANCED	A1.1 Review and adapt AI governance frameworks to address evolving AI issues and developments A1.2 Develop policy guidelines to promote data sharing across government agencies	A2.1 Develop targeted provisions/regulations for invisible/at-risk populations A2.2 Promote digital inclusion and accessibility in AI system design A2.3 Enhance public sector AI capacity A2.4 Build advanced AI skills and knowledge, including AI ethics and governance, to develop a stable AI talent pipeline (future-proof the workforce)	A3.1 Strengthen cybersecurity policies, mechanisms, and toolkits to mitigate AI risks A3.2 Build capabilities in Privacy-Enhancing Technologies (PETs) and other novel technologies	A4.1 Strengthen the AI start-up ecosystem A4.2 Support and promote multi-stakeholder knowledge-sharing
PROMISING	P1.3 Empower the national AI body/agency to coordinate government efforts/initiatives on AI	P2.5 Accelerate AI adoption among businesses of all sizes (multinationals, MSMEs, and start-ups). P2.6 Strengthen data and digital literacy skills, with a focus on the usage, processing, and analysis of datasets in AI systems and platforms	P3.3 Strengthen data protection and cybersecurity for the enablement of responsible AI P3.4 Promote the adoption of risk mitigation tools P3.5 Establish a national regulatory AI testbed/sandbox for AI innovation	P4.3 Raise public awareness of AI risks and benefits for people, communities, and organizations
EMERGING	E1.4 Develop a national AI strategy E1.5 Name a national AI body/agency to coordinate the implementation of national AI initiatives	E2.7 Build foundational digital skills and knowledge, data literacy, as well as AI fundamentals	E3.6 Strengthen data protection and privacy enforcement, and build cybersecurity foundations E3.7 Build risk mitigation and monitoring mechanisms	E4.4 Develop and maintain a regional repository of use cases on AI

Source: Access Partnership

Based on various consultative discussions and workshops conducted with a wide range of ASEAN stakeholders, eight of the Roadmap's action areas stand out as key priorities for the region:

1. **Enhance ASEAN public-sector capacities on AI**: Strengthen governmental and institutional capabilities through targeted training and development programs, ensuring effective AI policy alignment and implementation in the provision of digital services across the region.

2. **Strengthen the regional AI ecosystem through start-up incubation and strategic partnerships**: Foster innovation by supporting AI start-ups and facilitating partnerships between academia, industry, and government to drive interoperable technological advancements.

3. **Advance the development and accessibility of digital infrastructure and connectivity for AI**: Enhance the physical and technological foundations necessary for AI systems (fiber-optic and wireless broadband networks, data centers, Internet Exchange Points (IXPs), edge computing devices) and ensure thy are available and affordable across various regions and populations.

4. **Launch regional initiatives to promote inclusive community engagement and participation on AI**: Involve diverse groups of people in discussions and decision-making about AI development and its impacts, fostering a broad understanding and collaboration among different stakeholders to ensure the technology benefits all segments of society.

5. **Develop secure and trusted data-sharing platforms to enable interoperable AI systems**: Create robust, secure platforms for data sharing that ensure interoperability and data integrity, enabling seamless AI integration across different sectors.

6. **Enhance and advance multi-stakeholder dialogue on AI governance**: Leverage regional bodies such as the ASEAN Working Group on AI Governance and build on the key provisions of the *ASEAN Digital Economy Framework Agreement (DEFA)* to promote inclusive discussions involving governments, private sector, and civil society to shape balanced AI governance frameworks and policies.

7. **Multiply cross-border collaboration initiatives on AI and AI governance**: Increase regional and international cooperation on AI projects and governance strategies, leveraging the *ASEAN Guide on AI Governance and Ethics* to mobilize the exchange of knowledge, expertise, best practices, and resources for shared benefits.

8. **Sustain global engagement and collaboration for responsible AI**: Maintain active participation in global AI forums and partnerships, ensuring that ASEAN's voice is heard and recognized in global AI governance discussions and that its experience is used to both shape and follow international norms and best practices.

INTRODUCTION

BACKGROUND

As artificial intelligence (AI) grows into a decisive comparative advantage for emerging economies, there is a real opportunity for the Association of Southeast Asian Nations (ASEAN) to become a global AI leader. Indeed, ASEAN member states (AMS) have quickly understood the challenges posed by the rise of AI, as well as the urgency of addressing these challenges through effective governance and regulatory frameworks.

This is evidenced by the fact that responsible AI is slowly—but surely—making its way to the top of national and regional agendas in ASEAN. Across the region, governments are taking concrete steps to advance AI deployment and adoption, despite having largely different priorities and approaches to AI.

There is clear recognition of the many benefits of operationalizing AI responsibly, and there are many initiatives at both the national and regional levels to create the ideal conditions for responsible AI to flourish. However, these initiatives tend to falter in several ways.

First, several organizational barriers hinder the effective and consistent implementation of AI initiatives. In some cases, it is due to a lack of coordination on plans and initiatives, which results in overlapping efforts or contradicting measures. Unclear mandates for AI agencies are also an issue, as there tends to be confusion over the scope and scale of their mission. Lastly, considering that most national AI strategies in the region were launched in 2021, it may just be that responsible AI initiatives are too recent or too broad to have a substantial impact.

Second, responsible AI initiatives tend to be lower in priority as compared to policies that maximize profit-driven Venture Capital (VC)-attracting AI projects. Indeed, AI in the region is still largely seen and used as a cost-savings tool to maximize productivity and efficiency in profit-driven activities—as opposed to a multi-faceted agent of change that can drive and deliver a wide range of long-term, non-monetary benefits over time, especially when designed and deployed responsibly.

Most importantly, ASEAN economies are at vastly different degrees of digital transformation, which makes it difficult to overcome complex and deeply seated issues. From digital literacy and skills to ICT infrastructure and access to training and education, there are large disparities between and within SEA countries that limit the scope and scale of many digital economy policies in the region—effectively limiting the impact of SEA economies' efforts to grow into regional technology hubs.[6]

In this context, it is both urgent and important for ASEAN to develop a unified approach[7] that identifies the processes and mechanisms that allow responsible AI to drive economic growth and sustain economic development, as well as turn these observations into action.

OVERVIEW

The *ASEAN Responsible AI Roadmap (2025-2030)* (the Roadmap) is developed to provide actionable steps for ASEAN policymakers and stakeholders to create the ideal conditions for responsible AI to flourish in the region, as well as for AMS to leverage and enable responsible AI in a meaningful, impactful, and sustainable manner by 2030.

The Roadmap provides customized and step-by-step guidance for ASEAN governments to prioritize and operationalize responsible AI in an integrated and interoperable manner. It does this by providing tailored information on two main fronts: (1) foundational policy and regulatory factors that foster conducive and enabling environments for responsible AI to emerge in ASEAN; and (2) targeted actions, initiatives, and outcomes for a constructive and sustainable AI operationalization that takes AMS's specific needs, priorities, and capabilities into account.

As such, the Roadmap is envisioned as a consultative, participative, collaborative, and iterative endeavor, drawing from the feedback and input of a wide range of ASEAN experts and stakeholders.

[6] Portulans Institute (2022) Reviewing the state of Southeast Asia's digital transformation and opportunities for the region moving forward, https://networkreadinessindex.org/reviewing-the-state-of-southeast-asias-digital-transformation-and-opportunities-for-the-region-moving-forward

[7] Note: While differing actions may be required for economies at different stages of development, these efforts should be guided by an overarching ASEAN approach and common goals to ensure cohesive and inclusive progress in driving responsible AI across the region.

To this end, it is important to note that the Roadmap is developed to complement and support ASEAN's ongoing work in AI governance—namely, the *ASEAN Guide on AI Governance and Ethics* and its key deliverables; including the launch of an AI risk impact assessment template, the development of an AI Governance framework for ASEAN, the creation of an ASEAN Working Group on AI Governance, and the provision of both national- and regional-level recommendations for ASEAN governments to design, develop, and deploy AI systems responsibly.

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- Support AMS in the development and adoption of a regionally concerted approach to responsible AI enablement and operationalization;
- Provide actionable steps for lawmakers, policymakers, and regulators in ASEAN to leverage responsible AI in a meaningful, inclusive, and sustainable manner by 2030;
- Empower AMS and ASEAN stakeholders to drive and operationalize responsible AI across the region in a way that fits each country's specific needs, priorities, and capabilities; and
- Facilitate the alignment of AMS' national AI efforts with ASEAN's broader digitalization commitments and initiatives such as those outlined in the DEFA.

[8] ASEAN (2021) ASEAN Digital Masterplan 2025, https://asean.org/book/asean-digital-masterplan-2025
[9] ASEAN (2023) Framework for Negotiating ASEAN Digital Economy Framework Agreement, https://asean.org/wp-content/uploads/2023/09/Framework-for-Negotiating-DEFA_ENDORSED_23rd-AECC-for-uploading.pdf

BACKGROUND & APPROACH

BACKGROUND

The development of the *ASEAN Responsible AI Roadmap (2025-2030)* is anchored on the foundational efforts undertaken in the earlier stages of this project. Specifically, the **Landscape Overview** and the **Benchmarking Framework** that were developed as part of the Research Brief on *Responsible AI in Southeast Asia*.[10]

There are wide differences in the way economies in the region are enabling or leveraging responsible AI–despite a great shared appetite to harness its full potential. From unreliable digital infrastructure and uncoordinated institutions to lack of investment and shortage of digital skills, there are many obstacles in the way of ASEAN economies emerging as champions of responsible AI.

In this context, a one-size-fits-all approach is not the best way to put responsible AI at the top of ASEAN Member States' (AMS) digitalization agendas. Our discussions with AI experts in the region show that top-down, normative approaches seldom deliver results in ASEAN, as there are too many varying variables to control (namely, the fact that ASEAN is characterized by divergent financial, institutional, organizational, technical, and political preferences and priorities).

To this end, a benchmarking framework was developed to empower ASEAN economies to achieve two distinct but interconnected objectives: 1) Create a conducive and enabling policy and regulatory environment that allows a responsible AI ecosystem to emerge; and 2) operationalize responsible AI across society, government, and the economy at their own pace and in their own manner.

Developed for AMS to assess how they can enhance the operationalization of responsible AI in their communities, societies, and economies, both these elements provide a body of evidence that can be leveraged to develop practical initiatives and activities—with clear steps, objectives, and milestones that can be tracked and monitored over time.

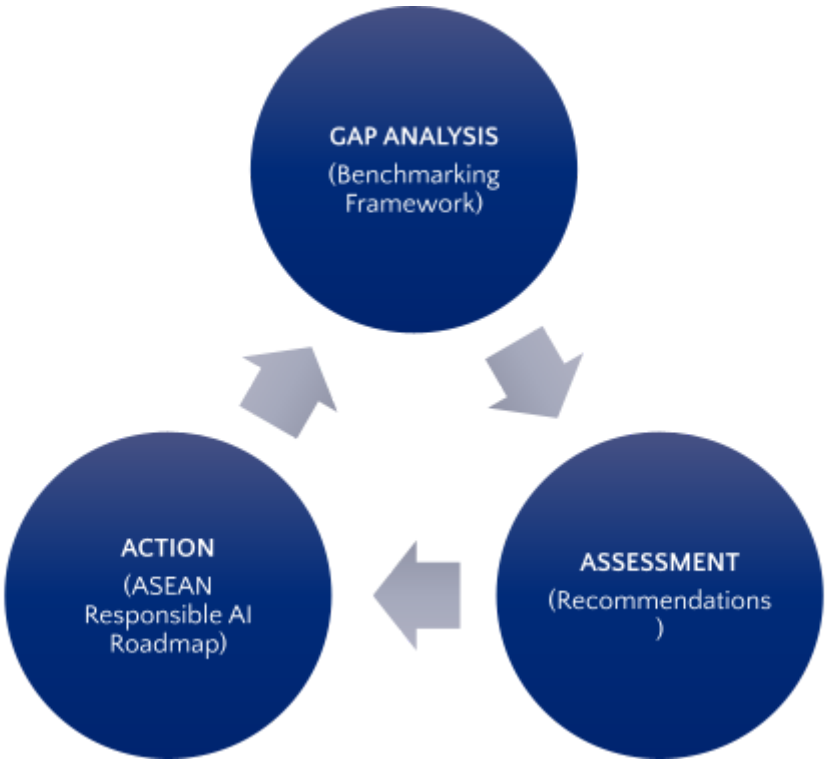
CONCEPTUAL FRAMEWORK

The three elements, the Benchmarking Framework (Gap Analysis), Assessment (Recommendations), and Roadmap (Action) are interconnected.

As illustrated in Figure 1 below, the findings of the Benchmarking Framework (Gap Analysis) and the landscape overview inform the development of the Recommendations (Assessment), which, in turn, translate into concrete initiatives with corresponding objectives and milestones in this Roadmap (Action). Subsequently, the action areas outlined in the Roadmap (Action) feed back into the Benchmarking Framework (Gap Analysis), thus completing the iterative cycle of analysis and action.

[10] Access Partnership (2023) Responsible AI in Southeast Asia: Tracking Progress and Benchmarking Impact, https://accesspartnership.com/ai-in-sea

Figure 1. Relationship between Evidence, Assessment, and Action



Source: Access Partnership

FROM THEORY TO ACTION

The recommendations formulated in the Research Brief are divided into two distinct but inter-related categories:

1. **Cross-Cutting Activities**: Designed for ASEAN and its sectoral bodies/committees to coordinate efforts, approaches, and resources for integrated AI operationalization.
2. **Targeted Activities**: Designed to give AMS tailored objectives and outcomes for AI operationalization based on the maturity/readiness level of their national AI ecosystems.

Together, both sets of recommendations aim to guide and support AMS governments and ASEAN stakeholders as they build enabling environments for responsible AI at both the regional and national levels.

Leveraging this holistic approach to AI operationalization, the *ASEAN Responsible AI Roadmap (2025-2030)* turns both sets of recommendations into two interconnected and complementary roadmaps:

1. **Priority pillars that ASEAN can action in a concerted manner at the regional level (cross-cutting)**: These are outlined in the Cross-Cutting Roadmap for ASEAN, which can be spearheaded by ASEAN and its sectoral bodies/committees.

    - **Cross-Cutting Pillar 1: Skills & Capacity Building** – Improving the skills and knowledge that are essential for a workforce to benefit from a digitalized global economy, with an emphasis on AI-related know-how. This includes the capacitation of ASEAN governments and stakeholders, including private-sector companies and higher education institutions.
    - **Cross-Cutting Pillar 2: Fairness & Inclusion** – Enhancing the visibility and voice of vulnerable, at-risk, or marginalized communities in the design and implementation of AI products, services, policies, and regulations. This includes the development of measures aimed at ensuring that AI is developed and deployed ethically, responsibly, transparently, and sustainably over time.

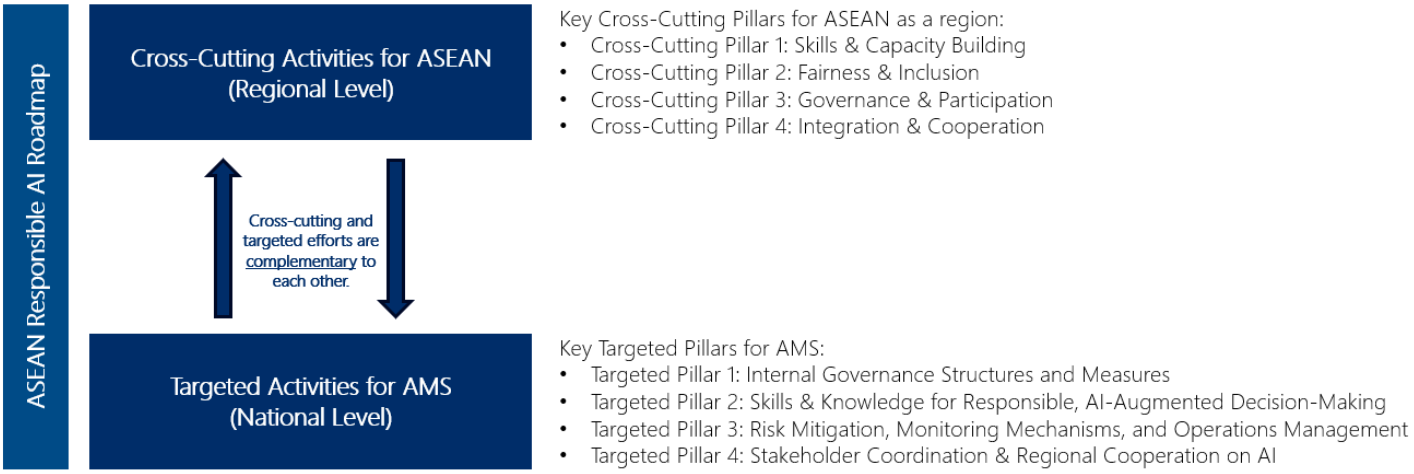
- **Cross-Cutting Pillar 3: Governance & Participation** – Foster an inclusive, representative, and consultative approach in the development of AI governance and regulatory frameworks to ensure that AI systems remain human-centric and inclusive. Additionally, establish mechanisms for the regular review and revision of the *ASEAN Responsible AI Roadmap (2025-2030)* to enhance its effectiveness and relevance amidst the evolving AI landscape.
- **Cross-Cutting Pillar 4: Integration & Cooperation** – Expanding the platforms for regional and global dialogue around key AI trends and issues. This includes amplifying the opportunities for ASEAN stakeholders to promote, discuss, and share knowledge on key directions, guidelines, mechanisms, and tools to support responsible AI deployment on a global scale.

2. **Priority pillars that AMS can action at the national level (targeted)**: These are outlined across four Targeted Roadmaps tailored to align with AMS' tiered assessment of their AI ecosystems' readiness ('Emerging', 'Promising', and 'Advanced').

    - **Targeted Pillar 1: Internal Governance Structures and Measures** – Promote awareness and support for the development and implementation of national AI policies, frameworks, strategies, and regulations.
    - **Targeted Pillar 2: Skills & Knowledge for Responsible, AI-Augmented Decision-Making** – Promote and strengthen skills, capabilities, and knowledge-sharing among the public and private sectors, educational institutions, and civil society to develop and deploy AI responsibly.
    - **Targeted Pillar 3: Risk Mitigation, Monitoring Mechanisms, and Operations Management** – Strengthen and promote the use of risk mitigation and monitoring and evaluation tools across the public and private sectors to mitigate risks and biases, minimize harm from AI, and align with responsible AI principles.
    - **Targeted Pillar 4: Stakeholder Coordination & Regional Cooperation on AI** – Promote regional efforts to develop common principles and a guiding approach to operationalizing responsible AI and align national efforts with the work of the ASEAN Working Group on AI Governance.

Figure 2 illustrates the complementary nature of both cross-cutting and targeted activities; together, they underscore a comprehensive strategy for the fair and durable operationalization of responsible AI across the region.

Figure 2. Relationship between Cross-Cutting and Targeted activities



Source: Access Partnership

TIMEFRAME

The Roadmap is currently set to cover a proposed five-year period between 2025 and 2030.

Table 2 below provides a proposed timeframe and a tentative timeline for AMS to operationalize the various cross-cutting and targeted activities described in the Roadmap (pages 18 and 52 of this document, respectively).

Table 2. Overview of proposed timeframe and tentative timeline for the operationalization of Roadmap activities

	2025	2026	2027	2028	2029	2030
Short Term	♦	♦				
Medium Term		♦	♦	♦		
Long Term			♦	♦	♦	♦

Source: Access Partnership

It is important to note that this timeframe is not meant to be seen as an obligation nor a constraint for AMS; the Roadmap has been designed to be implemented in a flexible and modular manner, allowing AMS to adapt it to their specific needs, priorities, and capabilities.

As such, this timeframe is presented here as an indicative starting point that may provide some broad guidance to policymakers looking to plan or structure their implementation milestones.

READINESS ASSESSMENT FOR TARGETED ACTIONS

The targeted activities of the Roadmap are structured around a responsible AI readiness self-assessment methodology that was developed for this Roadmap.

The methodology enables the assessment of the AI ecosystems of countries against 40 benchmarking criteria organized under four main pillars that are identified as fundamental building blocks for responsible, ethical, and sustainable AI to flourish.

The four assessment pillars are:

- **Assessment Pillar 1 – Internal Governance Structures and Measures**: All national AI laws, policies, and regulations—including AI-enabling measures and AI-adjacent initiatives—that enable the rise of data- and algorithm-driven technologies. This encompasses the formation of national bodies/agencies devoted to the enablement and operationalization of AI in general.
- **Assessment Pillar 2 – Human Centricity and Involvement**: Principles, guidelines, and standards that ensure AI is developed and leveraged in a fair, ethical, unbiased, inclusive, and sustainable manner—i.e., all mechanisms designed to make AI development and use responsible.
- **Assessment Pillar 3 – Risks and Operations Management**: The entrepreneurial and educational environment that equips the labor force with the skills, capabilities, and knowledge to develop and deploy AI responsibly—thus enabling investment and innovation around the responsible use of AI.
- **Assessment Pillar 4 – Stakeholder Interaction and Communication**: The wide range of stakeholders and organizations—including the private sector, academics, non-governmental organizations (NGOs), civil society organizations (CSOs), and not-for-profits—that contribute to mitigating risks and biases, and minimizing harm from AI.

Using the 40 benchmarking criteria and the corresponding scoring mechanism, the AI ecosystems of countries can be assessed and classified under one of three readiness tiers for each Assessment Pillar:[11]

[11] Note: The assessment methodology does not attribute weights to its Pillars, given the dynamic and multifaceted nature of driving and implementing responsible AI. Assigning weights risks oversimplifying the complex interplay of factors in an AI ecosystem. Instead, we have adopted a weight-neutral approach to capture a holistic evaluation, acknowledging that different contexts and stakeholders may prioritize different aspects of responsible AI.

- **Advanced**: A largely mature and enabling AI ecosystem that harnesses the transformative potential of fair, ethical, and responsible AI through a multitude of policy/regulatory enablers.[12] AI ecosystems in this Tier not only cultivate an enabling environment for AI, they also proactively spearhead innovative platforms, solutions, and initiatives for the wide operationalization of responsible and ethical AI. This is underpinned by a multitude of enablers, including governance frameworks geared at promoting safe, principled, and human-centered usage of AI, and forward-looking plans and mechanisms aimed at keeping policy and regulatory responses nimble and adaptive.

- **Promising**: A generally conducive AI ecosystem that supports and drives the development and deployment of responsible AI across a wide range of socio-economic use cases. AI ecosystems in this Tier have broad AI-enabling measures in place (national AI strategy, national AI agency, etc.), but grapple with challenges in areas such as AI talent, investment, and the entrepreneurial environment. A key challenge is the ability to effectively coordinate and consolidate institutional and organizational efforts—a barrier that hinders the sustained operationalization of responsible AI.

- **Emerging**: An up-and-coming AI ecosystem that still requires a number of foundational building blocks to effectively operationalize AI in a fair, ethical, and responsible manner. AI ecosystems in this Tier tend to lack a number of broad, overarching AI-enabling measures (plan, policy, or strategy), and as such are not yet ready to prioritize or operationalize responsible and ethical AI at a broader level. If these challenges can be overcome, responsible AI can be leveraged to both catch up with more mature ecosystems and further improve lives and livelihoods.

[12] Note: This report does not include a readiness assessment for AMS, as the objective is not to rank or compare AMS, but rather to provide the foundational methodology that will allow them to assess the maturity/readiness of their AI ecosystems. Access Partnership looks forward to working with AMS to provide guidance on conducting the readiness assessment. This guidance could include defining key terms, identifying key stakeholders, determining selection criteria, developing a sampling strategy and evaluation checklist, engaging respondents, and analyzing and validating data.

Table 3 below breaks down the possible categorization of AI ecosystems according to their maturity/readiness by Assessment Pillar:

Table 3. Description of readiness tiers for the responsible and ethical operationalization of AI (Pillar-focused categorization)

	ASSESSMENT PILLAR 1 – INTERNAL GOVERNANCE STRUCTURES AND MEASURES	ASSESSMENT PILLAR 2 – HUMAN CENTRICITY AND INVOLVEMENT	ASSESSMENT PILLAR 3 – RISKS AND OPERATIONS MANAGEMENT	ASSESSMENT PILLAR 4 – STAKEHOLDER INTERACTION AND COMMUNICATION
ADVANCED *(21-30 points out of 30) **	Comprehensive governance frameworks and policies that ensure safe, ethical, and responsible AI usage. These frameworks encompass adaptive mechanisms to address new, emerging challenges.	Strong emphasis on human-centric AI, with bodies and mechanisms specifically tasked with ensuring AI respects human rights, benefits society, and leaves no one behind.	Robust risk management frameworks and operational measures that proactively identify, mitigate, and manage AI-related risks. This includes continuous monitoring processes and regular improvement of operational practices.	Transparent and inclusive communication channels foster trust and collaboration, enabling the active engagement of diverse stakeholders in the development and deployment of AI systems. This includes industry, academia, civil society, and government.
PROMISING *(11-20 points out of 30) **	Major AI governance mechanisms and structures are established, but they lack full coordination and consolidation. Strong efforts are made but are not yet fully sustained or comprehensive.	Key human-centricity principles and guidelines are in place, but not yet prioritized or operationalized at the highest levels. Where operationalization exists, efforts are not yet fully integrated or consistent across the ecosystem.	Risk management practices are in place but are not yet fully integrated or proactive. Operations management is improving but still faces challenges in effectiveness and consistency.	Interaction with stakeholders is present but their engagement is neither institutionalized nor systematic. Communication channels exist but are not yet fully optimized for proactive engagement.
EMERGING *(0-10 points out of 30) **	Basic governance frameworks exist and recognize the importance of responsible AI but lack comprehensive implementation. Significant foundational elements are still needed.	There is a high-level recognition of the importance of human-centered AI, but AI investment and innovation remains focused on productivity-driven AI applications, as opposed to more transformative, problem-solving use cases.	Basic risk management and operational measures exist but are often reactive rather than proactive. Significant improvements are needed to build a resilient and adaptive risk management system.	Stakeholder interaction and communication is limited due to budding communication networks and a limited pool of AI experts/professionals. Significant efforts are needed to grow the national AI ecosystem so that its voice is heard.

** The 40 assessment criteria are spread across the four assessment pillars (10 criteria per pillar). Given that each assessment criteria has a maximum score of 3 points, the possible score for each pillar is 30 points.*

Source: Access Partnership

CROSS-CUTTING ROADMAP – CROSS-CUTTING ACTIONS & PRIORITIES

This section provides broad guidance for ASEAN as a region on cross-cutting activities that focus on concerted efforts and aligned approaches to responsible AI. Where possible, each action area comprises objectives, target areas, milestones, responsible parties, measures of progress, and international best practices/case studies.

Each action area focuses on four key pillars that are key foundational building blocks to advance responsible AI in a collaborative and cooperative manner across the region:

1. **Cross-Cutting Pillar 1: Skills & Capacity Building** – Improving the skills and knowledge that are essential for a workforce to benefit from a digitalized global economy, with an emphasis on AI-related know-how. This includes the capacitation of ASEAN governments and stakeholders, including private-sector companies and higher education institutions.

2. **Cross-Cutting Pillar 2: Fairness & Inclusion** – Enhancing the visibility and voice of vulnerable, at-risk, or marginalized communities in the design and implementation of AI products, services, policies, and regulations. This includes the development of measures aimed at ensuring that AI is developed and deployed ethically, responsibly, transparently, and sustainably over time.

3. **Cross-Cutting Pillar 3: Governance & Participation** – Foster an inclusive, representative, and consultative approach with a wide range of stakeholders in the development of AI governance and regulatory frameworks to ensure that AI systems remain human-centric and inclusive. Additionally, establish mechanisms for the regular review and revision of the *ASEAN Responsible AI Roadmap (2025-2030)* to enhance its effectiveness and relevance amidst the evolving AI landscape.

4. **Cross-Cutting Pillar 4: Integration & Cooperation** – Expanding the platforms for regional and global dialogue around key AI trends and issues. This includes amplifying the opportunities for ASEAN stakeholders to promote, discuss, and share knowledge on key directions, guidelines, mechanisms, and tools to support responsible AI deployment on a global scale.

OVERVIEW OF CROSS-CUTTING ROADMAP FOR ASEAN

As AI rapidly shapes the regional and global landscape, ASEAN stands at a pivotal juncture to harness the potential of AI technology not solely for economic advancement but also to ensure responsible, ethical, and inclusive deployment.

This cross-cutting roadmap for ASEAN serves as a strategic blueprint for the ASEAN Working Group on AI Governance to guide responsible AI development and deployment across the region. It charts a course for ASEAN to leverage AI as a driver for sustainable social progress, economic growth, and regional prosperity, while safeguarding against potential risks and ensuring equitable access to its benefits for all.

The action areas are developed in alignment with the recommendations outlined in the Research Brief, as well as the national and regional-level recommendations in the *ASEAN Guide on AI Governance and Ethics*. The key action areas are outlined in Table 4 below.

Note: In the first instance, ASEAN Digital Ministers' and Senior Officials (ADGMIN / ADGSOM) and the ASEAN Working Group on AI Governance are envisioned as the main responsible parties for the coordination/alignment of these cross-cutting activities. Where necessary/relevant, other sectoral bodies under the AEC may be involved with the implementation of the Roadmap.

Table 4. Overview of Key Cross-Cutting Action Areas for ASEAN

CROSS-CUTTING PILLAR 1: SKILLS & CAPACITY BUILDING	CROSS-CUTTING PILLAR 2: FAIRNESS & INCLUSION	CROSS-CUTTING PILLAR 3: GOVERNANCE & PARTICIPATION	CROSS-CUTTING PILLAR 4: INTEGRATION & COOPERATION
C1.1 Advance AI skill development across the ASEAN workforce C1.2 Enhance ASEAN public-sector capacities on AI C1.3 Strengthen the regional AI ecosystem through start-up incubation and strategic partnerships C1.4 Advance the AI research and innovation ecosystem in ASEAN C1.5 Advance the development and accessibility of digital infrastructure and connectivity for AI	C2.1 Launch regional initiatives to promote inclusive community engagement and participation on AI C2.2 Incentivize inclusive design and testing of AI systems/platforms C2.3 Raise awareness of AI risks and challenges in general and for vulnerable communities	C3.1 Develop secure and trusted data-sharing platforms to enable interoperable AI systems C3.2 Enhance and advance multi-stakeholder dialogue on AI governance C3.3 Continuously review and enhance the Roadmap and ensure its implementation is aligned with the *ASEAN Guide on AI Governance and Ethics* and the *ASEAN Digital Economy Framework Agreement (DEFA)*	C4.1 Advance regional capacity-building and knowledge-sharing C4.2 Multiply cross-border collaboration initiatives on AI and AI governance C4.3 Sustain global engagement and collaboration for responsible AI C4.4 Actively facilitate/participate in regional forums and initiatives on AI governance

Source: Access Partnership

CROSS-CUTTING PILLAR 1: SKILLS & CAPACITY BUILDING

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[13]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C1.1 Advance AI Skill Development Across the ASEAN Workforce**			
Objective(s)	• **Addressing the Skills Gap:** Bridging the AI skills gap in ASEAN fosters social inclusion by empowering individuals from diverse backgrounds to participate in the digital economy, promoting sustainable development and narrowing socioeconomic inequalities. • **Economic Competitiveness:** Developing AI skills regionally enhances ASEAN's economic competitiveness by fostering innovation, attracting investments, and propelling economic growth in key AI-driven industries including technology, finance, healthcare, and manufacturing. • **Increase Diversity and Inclusion:** Empowering individuals, particularly those from invisible or at-risk populations, with financial support and opportunities based on their demonstrated potential and interest in AI is essential for fostering diversity and inclusion within the AI ecosystem. This ensures that talent from diverse backgrounds can actively contribute and innovate in the AI field.			
C1.1.1 Advancing AI Skill Development Across the ASEAN Workforce	• **Regional Collaboration Framework:** Establish a collaborative framework among ASEAN member states to coordinate and implement AI skill development programs effectively. This framework should facilitate the sharing of best practices, resources, and expertise among member states, ensuring alignment with regional priorities and needs in AI skill development. • **Public-Private Partnerships for Skill Development:** Foster partnerships between governments, private sector organizations, and educational institutions to design and deliver AI skill development programs. These partnerships can leverage industry expertise, resources, and networks to ensure that skill development initiatives are relevant, up-to-date, and aligned with the demands of the labor market in ASEAN countries.	**Short-Term:** • Formulate a collaborative framework among ASEAN member states to facilitate the coordination of AI skill development programs. Define the roles, responsibilities, and governance structure of the framework. • Conduct a comprehensive needs assessment to identify the specific AI-related competencies required by ASEAN's workforce. • Based on the assessment findings, design tailored skill development programs encompassing both technical and non-technical skills. **Medium-Term:** • Roll out AI skill development programs across ASEAN member states, leveraging the collaborative framework established in the short term. Deliver training sessions, workshops, and courses to upskill and reskill individuals in AI-related competencies. • Implement monitoring and evaluation mechanisms to assess the effectiveness and impact of skill development programs. Collect feedback from	General measures of progress include: • **Participation Rates:** Measure the number of individuals participating in AI skill development programs across ASEAN member states. This includes tracking enrolment in training courses, workshops, and certification programs. • **Skill Acquisition:** Assess the acquisition of AI-related competencies among participants. This can be measured through pre- and post-training evaluations to gauge improvements in technical skills (e.g., data analysis, machine learning) and non-technical skills (e.g., ethical AI practices, critical thinking). • **Certification Rates:** Measure the increase in the number of individuals obtaining AI-related certifications across AMS. • **Number of Accredited Institutions or Organizations Offering AI-related Credentials:** Measure the increase in the number of accredited institutions or organizations providing AI-related training and credentials.	The European Union allocated EUR 580 million under the Digital Europe Program to fund AI skills education courses and training across the continent.[14] The program offers specialized education and training programs on AI, quantum, and high-power compute.[15] Furthermore, the program creates opportunities for European member states and stakeholders to foster collaboration. In October 2023, the Digital Europe Program Projects Meeting was organized to reflect on the progress on ongoing education projects, and to contribute to future policy actions and funding needs regarding AI education and training.[16]

[13] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[14] OECD (2023), The state of implementation of the OECD AI Principles four years on, https://doi.org/10.1787/835641c9-en.
[15] *Ibid.*
[16] LEADS (2023), Digital Europe Program's Groundbreaking Projects Unveiled: A Closer Look at Advanced Digital Skills Initiatives and Future Policy Directions https://advancedskills.eu/digital-europe-programmes-groundbreaking-projects-unveiled-a-closer-look-at-advanced-digital-skills-initiatives-and-future-policy-directions/

		participants and stakeholders to identify areas for improvement and optimization. **Long-Term:** • Expand the reach and scope of AI skill development programs to reach a broader audience across ASEAN countries. • Continuously enhance the content and delivery methods of programs to adapt to evolving technological trends and workforce demands.	• **Employment Outcomes:** Track job placement rates in AI and AI-related roles or fields, and measure the percentage of certified individuals employed in AI-related positions within six months of certification. • **Industry Adoption of AI:** Track the number of companies across ASEAN adopting AI technologies and practices, and measure the increase in AI-related projects or initiatives within various industries. • **Industry Engagement:** Evaluate the level of industry engagement and collaboration in the design and delivery of AI skill development programs. Measure the number of partnerships established with companies, industry associations, and chambers of commerce to ensure the relevance and effectiveness of training initiatives. • **Inclusivity and Diversity:** Assess the inclusivity and diversity of program participation. Monitor the representation of various demographic groups, including gender, age, ethnicity, and socioeconomic background, to ensure equitable access to AI skill development opportunities. • **Regional Distribution of AI Skill Development:** Measure the distribution of AI skill development opportunities across urban and rural areas within AMS. Track participation rates in AI training programs across AMS.	

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[17]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C1.2 Enhance ASEAN Public-Sector Capacities on AI**			
Objective(s)	• **Effective Policy Formulation:** Building capacity among ASEAN government officials equips them with the necessary skills and knowledge to formulate and implement policies related to AI effectively. This ensures that regulations are well-informed, adaptive, and conducive to fostering innovation while addressing ethical and societal concerns. • **Regional Consistency and Collaboration:** Capacity building promotes consistency and collaboration among ASEAN member states in AI governance. By enhancing the understanding of responsible AI practices among government officials, ASEAN can work towards harmonizing policies, sharing best practices, and collaborating on initiatives that benefit the region as a whole, fostering unity and progress in the AI landscape.			
C1.2.1 Enhancing AI Capacities Among ASEAN Civil Servants	**Responsible AI Policy Workshops:** Organize workshops and training programs for ASEAN government officials to enhance their understanding of responsible AI governance. These sessions should focus on best practices in policy formulation, compliance frameworks, and regulatory mechanisms to promote responsible AI deployment across the region.	**Short-Term:** • Utilize the existing compendium of use cases compiled by ASEAN to inform the content and discussions in the inaugural Responsible AI Policy Workshop, ensuring practical insights into the implementation of AI governance practices across diverse sectors in the region. • Enhance the dissemination of the compendium of use cases within ASEAN member states, leveraging digital platforms and communication channels to increase accessibility and awareness among relevant stakeholders. • Organize interactive sessions within the Responsible AI Policy Workshop series to facilitate discussions and knowledge-sharing based on the insights gleaned from the compendium of use cases, encouraging collaborative learning and exchange of best practices. **Medium-Term:** • Expand the scope of the Responsible AI Policy Workshop series to cover a wider range of topics and thematic areas, addressing emerging issues and priorities in AI governance within the ASEAN context. • Establish a mechanism for monitoring and evaluating the impact of the Responsible AI Policy Workshop series, collecting feedback from participants and stakeholders to measure the effectiveness and relevance of the workshops in advancing responsible AI governance practices across ASEAN member states. **Long-Term:** • Institutionalize the Responsible AI Policy Workshop series as a regular forum by the ASEAN Working Group on AI Governance, ensuring its continuity and	General measures of progress include: • **Participation Rates:** Measure the participation rates of ASEAN government officials in the responsible AI policy workshops. • **Feedback Mechanisms:** Establish feedback mechanisms to gather input from workshop participants on the effectiveness and relevance of the training sessions. • **Stakeholder Engagement:** Evaluate the level of engagement and collaboration among ASEAN member states and relevant stakeholders in promoting responsible AI governance.	The United States Department of States' Bureau of Cyberspace and Digital Policy partnered with the Atlantic Council to form AI Connect. The program aims to connect with policymakers, AI experts, industry, academic and civil society stakeholders on responsible AI stewardships.[18] The program includes monthly webinars, regional workshops and site visits which cover AI technologies, policy approaches, regulatory case studies and best practices in the Indo-Pacific, Central and South America, Europe, and Africa.[19]

[17] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[18] Atlantic Council (2024), AI Connect, www.atlanticcouncil.org/programs/geotech-center/ai-connect/
[19] *Ibid.*

		sustainability as a platform for ongoing dialogue and collaboration on AI governance issues. • Foster deeper engagement and participation in the Responsible AI Policy Workshop series by expanding outreach efforts to include a wider range of stakeholders, including government agencies, industry partners, civil society organizations, and academic institutions, thereby enhancing the impact and influence of the workshops on the regional AI ecosystem.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[20]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C1.3 Strengthen the Regional AI Ecosystem through Start-Up Incubation and Strategic Partnerships**			
Objective(s)	• **Promoting Innovation:** Establishing incubation programs for AI start-ups encourages innovation within the ASEAN region, fostering the development of new AI technologies and solutions that can address regional challenges and drive economic growth. • **Access to Expertise and Resources:** Strategic partnerships with tech giants like Google and IBM provide AI start-ups in ASEAN with access to valuable expertise, resources, and mentorship programs. This collaboration enhances the capabilities of start-ups, accelerates their growth, and increases their chances of success in the competitive AI market.			
C1.3.1 AI Start-Up Support	**ASEAN AI Start-up Incubation:** Establish incubation programs and support mechanisms for AI start-ups in ASEAN, aiming to support their growth and sustainability in the regional ecosystem. These programs should provide tailored training on AI technology development, business strategy, access to funding, and navigating regulatory landscapes in ASEAN.	**Short-Term:** • Identify key stakeholders and partners interested in supporting AI start-ups in ASEAN. • Develop a framework for the AI start-up incubation programs, outlining objectives, eligibility criteria, and support mechanisms. • Launch incubation centers or hubs in strategic locations across ASEAN countries. **Medium-Term:** • Expand the reach of incubation programs to cover more ASEAN countries, ensuring broad participation and inclusivity. • Forge partnerships with investors, venture capitalists, and industry experts to provide funding and mentorship opportunities for incubated start-ups. • Scale up mentorship and networking activities, organizing regional events and conferences to facilitate collaboration and knowledge exchange. • Evaluate the impact of incubation programs through performance metrics such as start-up success rates, job creation, and revenue generation. **Long-Term:** • Establish a sustainable framework for AI start-up incubation within the ASEAN ecosystem, including funding mechanisms and governance structures. • Continuously adapt and evolve incubation programs to meet the changing needs and challenges of AI start-ups in the region. • Monitor the growth and success of incubated start-ups, tracking metrics such as job creation, revenue generation, and market expansion, to demonstrate the impact of the programs over time.	General measures of progress include: • **Number of AI start-ups incubated:** Track the number of AI start-ups that participate in incubation programs established in ASEAN countries, indicating the effectiveness of the programs in supporting start-up growth and sustainability. • **Funding raised by incubated start-ups:** Measure the amount of funding secured by AI start-ups that have graduated from incubation programs, reflecting their success in attracting investment and scaling their operations. • **Partnerships and Collaborations:** Measure the number of partnerships and collaborations formed or established between AI start-ups and other industry players, such as corporations, research institutions, and government agencies.	The Victorian government 's start-up Agency, LaunchVic, allocated AUD 1.5 million in 2021 to Boab Ventures, an AI accelerator.[21] The program is a subsidiary of Artesian Ventures, a venture capital firm based in Australia.[22] The accelerator offers pre-seed, scale-up, venture and consulting programs to start-ups in Australia. It aims to provide investment advisory, partnerships, and mentorships to eligible start-ups.[23] Thus far, the accelerator has invested AUD 16 million in deep tech including AI. It has also created more than 100 jobs across its portfolio of investment.[24]

[20] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[21] Denham Sandler (2021), Vic govt funds 'Australia first' AI program,www.innovationaus.com/vic-govt-funds-australia-first-ai-program
[22] Boab Ventures (2024), About us, https://boab.ventures/about-us
[23] Boab Ventures (2024), Home, https://boab.ventures
[24] *Ibid.*

		• Position ASEAN as a hub for AI innovation and entrepreneurship, attracting talent, investment, and attention from the global AI community.		
C1.3.2 Strategic Partnerships with Tech Multinationals for AI Capacity-Building	**Strategic Partnerships with Tech Giants:** Foster strategic partnerships with leading technology companies such as Google, IBM, and others to deliver joint initiatives aimed at providing training, resources, and expertise to ASEAN governments, businesses, and educational institutions. Establish knowledge-sharing platforms, workshops, and mentorship programs facilitated by tech giants to support AI skill development and innovation in ASEAN.	**Short-Term:** • Identify potential areas of collaboration and common interests between ASEAN and leading technology companies like Google and IBM. • Initiate discussions with these tech giants to explore partnership opportunities and establish a framework for cooperation. • Organize initial meetings and workshops to discuss the scope, objectives, and expected outcomes of the joint initiatives. **Medium-Term:** • Formalize strategic partnerships with selected tech giants through memorandum of understanding (MOUs) or partnership agreements. • Develop detailed plans and action strategies for implementing joint initiatives, including training programs, resource sharing, and knowledge exchange activities. • Launch knowledge-sharing platforms, workshops, and mentorship programs facilitated by tech giants to support AI skill development and innovation in ASEAN countries. **Long-Term:** • Implement and scale up the joint initiatives in collaboration with tech giants, reaching a wider audience of governments, businesses, and educational institutions across ASEAN. • Evaluate the effectiveness and impact of the partnership programs through feedback mechanisms, surveys, and performance metrics. • Sustain and expand the strategic partnerships over time, adapting to emerging trends and evolving needs in the AI ecosystem, to ensure continued support for AI skill development and innovation in ASEAN.	General measures of progress include: • **Number of successful partnerships with tech giants:** Monitor the establishment of partnerships between ASEAN governments, businesses, and educational institutions with leading technology companies such as Google, IBM, and others. This indicates the effectiveness of efforts to foster collaboration and knowledge-sharing in the AI ecosystem. • **Participation in training and mentorship programs:** Evaluate the level of participation in training workshops, mentorship programs, and knowledge-sharing initiatives facilitated by tech giants, assessing the engagement of ASEAN stakeholders in enhancing their AI skills and capabilities.	The United States government created the United States AI Safety Institute Consortium (AISIC) to connect with industry researcher, partners, and other relevant stakeholders. The AISIC aims to support the development and deployment of safe and trustworthy AI and contribute to actions such as developing guidelines for red-teaming, evaluations, risk management, and watermarking.[25] AISIC currently consists of more than 200 companies, including Google, OpenAI, Anthropic, and Microsoft.[26]

[25] NIST (2024), Biden-Harris Administration Announces First-Ever Consortium Dedicated to AI Safety, www.nist.gov/news-events/news/2024/02/biden-harris-administration-announces-first-ever-consortium-dedicated-ai
[26] NIST (2024), AISIC Members, www.nist.gov/artificial-intelligence/artificial-intelligence-safety-institute/aisic-members

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[27]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C1.4 Advance the AI Research and Innovation Ecosystem in ASEAN**			
Objective(s)	• **Driving Regional Innovation:** Establishing regional AI research centers, developing innovation clusters, and providing funding for joint research projects fosters an environment conducive to innovation. By bringing together diverse stakeholders, including universities, research institutions, industry partners, and government agencies, these initiatives facilitate collaboration, knowledge exchange, and the development of cutting-edge AI technologies tailored to the needs of ASEAN. • **Driving Regional Economic Development**: Investing in AI research and innovation strengthens ASEAN's position as a hub for technological advancement and economic growth. By nurturing a thriving AI ecosystem, these action areas attract talent, foster entrepreneurship, and drive investment in the region. Furthermore, the resulting innovations have the potential to address regional challenges and create new opportunities across various sectors, contributing to the sustainable development of ASEAN countries.			
C1.4 Advancing AI Research and Innovation Ecosystem in ASEAN	• **Establish Regional AI Research Centers:** Allocate resources to establish dedicated AI research centers strategically located across ASEAN's higher education institutions. These centers will serve as hubs for collaborative research, innovation, and knowledge exchange in AI. • **Develop Innovation Clusters:** Foster the creation of innovation clusters within ASEAN, bringing together universities, research institutions, industry partners, and government agencies to drive AI development and commercialization in the region. • **Provide Funding for Joint Research Projects:** Offer financial support and grants to facilitate joint research projects and initiatives among ASEAN's higher education institutions. These funds will enable collaborative efforts to address regional challenges	**Short-Term:** • Assess the feasibility of establishing regional AI research centers and innovation clusters, including evaluating potential locations, infrastructure requirements, and funding sources. • Forge partnerships with key stakeholders, including universities, research institutions, industry partners, and government agencies, to lay the groundwork for collaborative AI research initiatives. • Identify priority areas for joint research projects, considering the needs and opportunities in AI innovation and education within the ASEAN region. **Medium-Term:** • Establish dedicated AI research centers in strategic locations across ASEAN, equipped with state-of-the-art facilities and staffed with expert researchers and educators. • Foster the development of innovation clusters within ASEAN, facilitating collaboration and knowledge exchange among academia, industry, and government stakeholders. • Initiate joint research projects funded by ASEAN grants, focusing on addressing specific regional challenges and advancing AI innovation in key areas such as healthcare, agriculture, and smart cities. **Long-Term:** • Expand the network of regional AI research centers and innovation clusters, fostering broader collaboration and partnership opportunities among ASEAN countries. • Achieve research breakthroughs and innovations through collaborative efforts, contributing to the	General measures of progress include: • **Number of Established AI Research Centers:** Track the establishment of dedicated AI research centers across ASEAN countries to gauge progress in creating hubs for collaborative research and innovation in AI. • **Formation of Innovation Clusters:** Monitor the development of innovation clusters within ASEAN, assessing the number of clusters established and their effectiveness in driving AI development and commercialization. • **Funding Allocation and Utilization:** Measure the amount of funding allocated to joint research projects in AI and track how effectively these funds are utilized to support collaborative efforts among higher education institutions. • **Research Outputs and Collaborations:** Evaluate the number of joint research projects initiated, publications produced, patents filed, and collaborations established among ASEAN's higher education institutions in the field of AI.	Case Study 1: The Philippines Department of Trade and Industry (DTI) spearheaded the launch of the Center for AI Research in July 2024.[28] The CAIR's vision is to harness AI's transformative potential to address pressing societal and industrial challenges, fuel economic growth, and promote inclusive development. It promotes socio-economic research and development (R&D), enhances scientific knowledge, strengthens the country's technological competitiveness, and provides AI solutions for regional challenges such as sustainable agriculture, urban planning, and disaster resilience.[29] Case Study 2: ELISE, the European Network of AI Excellence Centers, was established with funding received from the European Union's Horizon 2020 research and innovation program.[30] ELISE is a network of AI research hubs which connects with higher education institutions in Europe.

[27] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[28] DTI (n.d.) DTI launches National AI Strategy Roadmap 2.0 and Center for AI Research, positioning the Philippines as a Center of Excellence in AI R&D, https://www.dti.gov.ph/news/dti-launches-national-ai-strategy-roadmap-2-0-center-ai-research-positioning-philippines-center-excellence-ai-rampd/
[29] NEDA (2024) Launch of Center for AI Research, https://neda.gov.ph/launch-of-ai-roadmap-center-for-ai-research-to-unlock-new-opportunities-in-ph-digital-economy-neda/#:~:text=CAIR%20aims%20to%20position%20the,%2C%20engineers%2C%20and%20R%26D%20personnel
[30] ELISE (2024), Home, www.elise-ai.eu/

	and opportunities in AI innovation and education.	advancement of AI technology and its applications in addressing societal challenges. • Position ASEAN as a leading hub for AI research and innovation, attracting investment, talent, and opportunities to drive economic growth and development in the region.		According to ELISE's Strategic Research Agenda, the network focuses on supporting projects on security and privacy explainable and transparent AI, trustworthiness and AI certification, AI interoperability, AI ethics and societal impact.[31] In addition to fostering collaboration amongst higher education institutions in Europe, ELISE also work with SMEs and enterprises to conduct joint research on AI services and applications.[32]

[31] ELISE (2024), European Strategic Research Agenda in Artificial Intelligence, www.elise-ai.eu/work/agenda-and-programs
[32] ELISE (2024), Industry-Academia Collaboration, www.elise-ai.eu/work/industry

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[33]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C1.5 Advance the development and accessibility of digital infrastructure and connectivity for AI**			
Objective(s)	• **Fostering Innovation and Economic Growth:** Robust digital infrastructure and connectivity is essential for facilitating the development and deployment of AI technologies. By investing in high-speed broadband networks, data centers, and cloud computing services, a conducive ecosystem can be developed to drive innovation and economic growth. • **Promoting Social Inclusion and Equity:** Access to digital infrastructure and connectivity is essential for ensuring that all segments of society can benefit from AI advancements. Extending high-speed broadband networks to underserved and remote areas and promoting affordable and accessible digital services can bridge the digital divide and foster greater inclusion. This enables individuals and communities, regardless of their geographical location or socioeconomic status, to access educational resources, healthcare services, employment opportunities, and other essential services facilitated by AI technologies. Prioritizing equitable access to digital infrastructure can mitigate the risk of exacerbating existing disparities in AI adoption and utilization. • **Accelerate AI Development:** Expedite the pace of AI development by providing reliable and localized access to high-performance computing (HPC) infrastructure and capabilities, enabling developers and researchers to tackle complex AI challenges and accelerate the deployment of AI technologies in real-world applications.			
C1.5.1 Improving Digital Infrastructure and Connectivity in ASEAN	• **Enhance ICT Infrastructure, Wireless Networks, and Broadband Speed and Capacity:** Invest in upgrading existing infrastructure to support higher speeds and capacities, ensuring reliable connectivity for AI applications. • **Cloud Computing Adoption:** Promote the adoption of cloud computing services to provide scalable and cost-effective infrastructure for AI development and deployment. • **Develop and Upgrade Data Centers:** Build and upgrade data center facilities to accommodate the growing demand for storage and processing of data generated by AI applications. • **Provide Access to High-Performance Computing Infrastructure and Capabilities:** Invest in the establishment and expansion of high-performance computing (HPC) infrastructure to provide access to advanced computing capabilities necessary for AI innovation.	**Short-term:** • Evaluate current broadband infrastructure to identify areas requiring immediate upgrades for enhanced speed and capacity. • Assess the readiness of existing data centers to support increased data processing demands. • Initiate pilot projects to test upgrades in selected areas, focusing on improving broadband speed and capacity. • Explore cloud computing services for small-scale AI applications to assess feasibility and benefits. • Assess the current state of high-performance computing infrastructure and identify gaps in availability and accessibility for AI research and development. **Medium-term:** • Begin large-scale upgrades of broadband infrastructure to enhance speed and capacity across ASEAN regions. • Cultivate relationships with trusted providers like Amazon Web Services, Google Cloud, and Microsoft Azure to secure credits and expand the adoption of their scalable infrastructure for medium-sized AI projects. • Commence the development of new data centers and the upgrade of existing facilities to	General measures of progress include: • **Percentage increase in broadband coverage:** Measure the expansion of broadband internet access to previously underserved areas by calculating the percentage increase in coverage over time. • **Data Center Expansion:** Track the increase in the number of data centers built or upgraded to meet the demand for data storage and processing. Monitor progress by assessing completed construction projects, expanded storage capacities, and infrastructure enhancements. • **Cloud Computing Adoption Rate:** Evaluate the adoption of cloud computing services among organizations. Measure progress by observing the migration of operations to cloud platforms, growth in hosted data and workloads, and achieved cost savings and efficiencies. • **Utilization Rates:** Track the utilization rates of HPC infrastructure, indicating the extent to which resources are effectively utilized for AI research and development. • **Number and quality of AI research projects and innovations facilitated by access to HPC infrastructure:** This	In 2023, IMDA and the Ministry of Communications and Information (MCI) in Singapore jointly released the Digital Connectivity Blueprint. This blueprint aims to outline the necessary digital infrastructures to improve connectivity.[34] Key priorities highlighted in the Blueprint include enhancing high-speed, low-latency connectivity through bandwidth expansion in the Nationwide Broadband Network (NBN) and allocating spectrum for 5G.[35] In addition, the Singapore Economic Development Board (EDB) and the IMDA also approved the proposals of four data center operators in Singapore under the Data Center - Call for Application (DC-CFA) exercise in 2023, in which a total of 80MW of capacity was awarded.[36]

[33] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[34] Infocomm Media Development Authority (2023), Digital Connectivity Blueprint (DCB), www.imda.gov.sg/how-we-can-help/digital-connectivity-blueprint
[35] IMDA(2023), Singapore's Digital Connectivity Blueprint , www.imda.gov.sg/-/media/imda/files/programme/digital-connectivity-blueprint/digital-connectivity-blueprint-report.pdf
[36] Infocomm Media Development Authority (2023),Four data center proposals selected as part of pilot Data Centre Call for Application ("DC-CFA"), www.imda.gov.sg/resources/press-releases-factsheets-and-speeches/press-releases/2023/four-data-centre-proposals-selected-as-part-of-pilot-data-centre-call-for-application

		accommodate the growing demand for data storage and processing. ● Implement measures to ensure data center security and compliance with AI governance standards. ● Initiate the process of expanding high-performance computing infrastructure by securing funding and launching construction or procurement projects for new facilities or upgrades. **Long-term:** ● Complete comprehensive upgrades of broadband infrastructure, achieving consistent high-speed connectivity across all ASEAN countries. ● Implement measures to ensure equitable access to enhanced broadband services, particularly in underserved and remote areas. ● Fully integrate cloud computing services into AI development and deployment strategies, leveraging scalable and cost-effective infrastructure. ● Establish sustainable partnerships with cloud service providers to optimize AI solutions and ensure compatibility with regional data governance frameworks. ● Expand data center capacity to meet the increasing demand for data storage and processing driven by AI applications. ● Implement sustainable practices in data center operations to minimize environmental impact and energy consumption. ● Implement and complete the construction or upgrade of high-performance computing facilities, ensuring that they meet the necessary specifications for supporting AI research and development activities.	measure assesses the impact of HPC resources on the generation of AI research outputs and innovations, indicating the effectiveness of infrastructure expansion and resource allocation in driving progress in the field. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: ● Q21. Do the public and private sectors have the infrastructure to develop, deploy, and adopt AI solutions?	

CROSS-CUTTING PILLAR 2: FAIRNESS AND INCLUSION

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[37]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C2.1 Launch Regional Initiatives to Promote Inclusive Community Engagement and Participation on AI**			
Objective(s)	• **Representation and Inclusivity:** Establishing AI advisory boards that include representatives from invisible/at-risk communities and the industry to ensure diverse voices are heard in the development and implementation of AI policies and initiatives across ASEAN Member States. This promotes inclusivity, equity, and representation within the decision-making processes, leading to more comprehensive and responsive AI development that addresses the needs of all communities. • **Inclusive Policy Implementation:** Conducting regular consultations and feedback sessions with members of the AI advisory boards allows for the gathering of valuable insights into specific challenges and concerns regarding AI technologies within invisible/at-risk communities. By incorporating this feedback into the development and implementation of AI policies and initiatives in ASEAN, policymakers can ensure that these measures are inclusive, equitable, and aligned with the region's diverse needs and priorities.			
C2.1.1 Inclusive Community Engagement	• **Community Empowerment through AI Advisory Boards:** Establish AI advisory boards that include representatives from vulnerable, at-risk, or marginalized communities, along with industry representatives across ASEAN Member States. Where possible, name/create a body in charge of identifying local AI needs/priorities for invisible/at-risk communities. • **Inclusive AI Development through Consultation Sessions:** Conduct regular consultations and feedback sessions with members of the AI Advisory Board to gather insights into their specific challenges and concerns regarding AI technologies. Incorporate feedback gathered from consultations into the development and implementation of AI policies and initiatives in ASEAN, ensuring that they are inclusive, equitable, and aligned with the region's diverse needs and priorities.	**Short-Term:** • Identify and reach out to potential representatives from vulnerable, at-risk, or marginalized communities, along with industry representatives across ASEAN Member States to form AI advisory boards. • Develop guidelines and criteria for the selection of board members, ensuring diversity and inclusivity in representation. • Conduct inaugural meetings to introduce board members, establish goals, and outline the scope of their advisory role. **Medium-Term:** • Organize the first round of consultation sessions with AI advisory board members to gather insights into their specific challenges and concerns regarding AI technologies. • Utilize various engagement methods such as focus groups, surveys, and interviews to capture diverse perspectives. • Analyze feedback and identify key themes and priorities to inform the development of inclusive AI policies and initiatives. • Provide training and capacity-building opportunities for AI advisory board members to enhance their understanding of AI technologies and policy-making processes.	General measures of progress include: • **Representation in the AI Advisory Board:** Monitor the diversity of board members, including representation from vulnerable, at-risk, or marginalized communities, to ensure diverse perspectives are considered. • **Participation Rate in Consultation Sessions:** Measure participation rates in consultation sessions conducted by AI advisory boards to gauge community engagement and involvement. • **Stakeholder Engagement:** Measure collaboration and partnership among government ministries, civil society organizations, industry stakeholders, and international partners in supporting the work of AI advisory boards. • **Community Satisfaction and Trust:** Measure the level of community satisfaction and trust in the AI initiatives and the organizations leading them.	The United States National AI Advisory Committee (NAIAC) is created provide independent assessment and recommendations to the President and the National Initiative Office (NAIIO). The NAIAC covers issues such as AI R&D, standards, education, and ethics.[38] The NAIAC consists of a diverse range of stakeholders from academia, industry, non-profits, civil societies, and Federal laboratories.[39] The ensure greater representation, the NAIAC invites experts to participate in regular committee meetings. Some experts and organizations invited to participate in the meetings include American Association of People with Disabilities; Asian Americans Advancing Justice; Hispanic Technology and Telecommunications Partnership, amongst others.[40]

[37] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[38] Center for AI and Digital Policy (2024), National AI Advisory Committee (US), www.caidp.org/resources/naiac/
[39] *Ibid.*
[40] Center for AI and Digital Policy (2024), National AI Advisory Committee (US), www.caidp.org/resources/naiac/

		Long-Term: • Strengthen engagement and collaboration between advisory board members, policymakers, industry stakeholders, and AI developers through regular meetings, workshops, and networking events. • Provide training and capacity-building opportunities for AI advisory board members to enhance their understanding of AI technologies and policy-making processes. • Strengthen engagement and collaboration between advisory board members, policymakers, industry stakeholders, and AI developers through regular meetings, workshops, and networking events. • Foster partnerships with relevant organizations and institutions to support the work of the AI advisory boards and amplify their impact across the ASEAN region.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[41]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C2.2 Incentivize Inclusive Design and Testing of AI Systems/Platforms**			
Objective(s)	• **Enhanced Accessibility and Usability:** Facilitating inclusive design and testing practices can ensure that AI technologies are accessible to a diverse range of users, including those from underrepresented communities. • **Reduced Bias and Discrimination:** Inclusive design and testing practices help mitigate bias and discrimination in AI systems by ensuring that they are designed to be fair, equitable, and unbiased for all users.			
C2.2.1 Inclusive Design and Testing	• **Diverse Stakeholder Engagement:** Facilitate inclusive design and testing practices by fostering collaboration among ASEAN Member States and engaging a wide range of stakeholders throughout the AI development lifecycle. Encourage participation from underrepresented communities, civil society organizations, academia, industry experts, and policymakers to ensure a comprehensive range of perspectives and experiences are incorporated into the process. • **Accessible Design Standards and Guidelines:** Promote the adoption of principles of universal design, usability, and accessibility from the outset of AI development to address potential barriers and ensure equitable access to AI technologies for users of all abilities and backgrounds across ASEAN member states. This involves working closely with AI developers and professional AI assessors to ensure international best practices and standards are followed.	**Short-Term:** • Launch awareness campaigns to highlight the importance of inclusive design and testing practices in AI development across ASEAN Member States. • Conduct outreach activities targeting stakeholders, including underrepresented communities, civil society organizations, academia, industry experts, and policymakers, to raise awareness and encourage participation. • Organize stakeholder engagement initiatives such as workshops, webinars, and forums to facilitate discussions on inclusive design practices and gather input from diverse perspectives. • Encourage active participation from stakeholders throughout the AI development lifecycle to ensure comprehensive insights are considered. **Medium-Term:** • Implement capacity-building and training programs to enhance the skills and knowledge of stakeholders on principles of universal design, usability, and accessibility in AI development. • Offer workshops, seminars, and online courses to educate developers, policymakers, and other stakeholders on integrating inclusive design practices into AI projects. **Long-Term:** • Establish platforms for the dissemination of best practices and success stories related to inclusive design and testing in AI development across ASEAN Member States. • Share insights and experiences through conferences, publications, and knowledge-sharing networks to foster learning and collaboration among stakeholders.	General measures of progress include: • **Participation Rates:** Measure the participation rates of stakeholders, including underrepresented communities, civil society organizations, academia, industry experts, and policymakers, in workshops, forums, and other engagement initiatives focused on inclusive design and testing practices. • **Awareness and Understanding:** Conduct surveys or assessments to gauge the awareness and understanding of stakeholders regarding the importance and principles of inclusive design and testing in AI development. Track improvements in awareness levels over time through targeted educational campaigns and outreach efforts. • **Adoption of Inclusive Practices:** Monitor the adoption of inclusive design principles and testing methodologies in AI development projects and products across ASEAN member states.	The AI and Accessibility Research Symposium organized by the World Wide Web Consortium (W3C)'s Web Accessibility Initiative (WAI) was an event that examined the challenges and opportunities brought about by AI on digital accessibility. The event was attended by policymakers, researchers, industry, and people with disabilities.[42] The Symposium raised awareness on accessibility considerations which should be embedded in AI development, and the need to incorporate accessibility data in AI training.[43] Additionally, it emphasized the development of standards to ensure fair and ethical use of AI in digital accessibility.[44]

[41] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[42] W3C Web Accessibility Initiative, Artificial Intelligence (AI) and Accessibility Research Symposium 2023, www.w3.org/WAI/research/ai2023/
[43] *Ibid.*
[44] *Ibid.*

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[45]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C2.3 Raise Awareness of AI Risks and Challenges in General and for Vulnerable Communities**			
Objective(s)	• **Promoting Inclusive and Ethical AI Development:** By raising awareness of the risks and challenges faced by vulnerable communities in the AI ecosystem, stakeholders, including policymakers, industry players, and researchers, are encouraged to prioritize inclusivity, fairness, and transparency in AI design and deployment. This fosters a more equitable and responsible AI ecosystem that benefits all members of society. • **Empowering Vulnerable Communities:** A regional awareness campaign on the risks and challenges vulnerable communities face in the AI ecosystem is crucial for empowering these communities with knowledge and awareness. By raising awareness of the potential risks associated with AI technologies, individuals within vulnerable communities can make informed decisions, advocate for their rights, and actively participate in shaping AI policies that affect them.			
C2.3.1 Raising Awareness of AI Risks and Challenges in General and for Vulnerable Communities	• **Identification of Specific AI Risks and Challenges:** Collaborate with ASEAN Member States to conduct research to identify specific risks and challenges faced by vulnerable communities in the AI ecosystem. • **Stakeholder Engagement:** Engage stakeholders including policymakers, civil society organizations, academia, industry experts, and representatives from vulnerable communities in discussions to gather insights and perspectives. • **Awareness Campaign:** Launch a targeted awareness campaign using diverse communication channels to raise awareness on the need for inclusive AI design and deployment and the AI risks and challenges that vulnerable/underrepresented communities face.	**Short-Term:** • Collaborate with ASEAN Member States to conduct research on AI risks and challenges for vulnerable communities. • Define research objectives, methodologies, and timelines for data collection and analysis. • Identify key stakeholders, including policymakers, civil society organizations, academia, industry experts, and representatives from vulnerable communities. • Develop an engagement plan that outlines communication strategies, meeting schedules, and methods for gathering insights and perspectives. • Initiate planning for the awareness campaign, outlining campaign objectives, target audiences, messaging strategies, and communication channels. • Establish partnerships with media outlets, online platforms, and community organizations to support campaign outreach. **Medium-Term:** • Conduct research activities in collaboration with ASEAN Member States to collect data on AI risks and challenges faced by vulnerable communities. • Analyze research findings to identify common themes, trends, and areas of concern across the region. • Organize stakeholder engagement workshops, focus groups, and discussions to gather insights and perspectives on AI risks and challenges. • Facilitate dialogue between diverse stakeholders to foster collaboration and exchange of ideas.	General measures of progress include: • **Research Outputs:** Measure the number of research studies conducted on AI risks and challenges faced by vulnerable communities. • **Stakeholder Engagement:** Monitor the level of participation and representation of stakeholders, including vulnerable communities, in stakeholder engagement activities such as workshops, focus groups, and consultations. • **Change in Awareness Levels:** Evaluate changes in awareness levels and understanding of AI risks among policymakers, stakeholders, and the general public through surveys. • **Policy Development and Implementation:** Monitor the adoption and implementation of policies, regulations, or guidelines addressing AI risks for vulnerable communities at the national or regional level. • **Emergence of Community-Led Initiatives:** Measure the emergence of community-led initiatives supported by increased awareness and understanding of AI risks and challenges.	The Joint Research Centre (JRC) under the European Commission conducted research on AI and the Rights of the Child. The research seeks to shed light on the impact of AI on children's rights. In particular, it outlines risks unique to children in using AI, such as privacy, data protection, cybersecurity, over trust, reduction of autonomy and oversight.[46] Further, it identifies knowledge gaps, and engagements required between researchers and policymakers to advance the development of trustworthy AI that respects children's rights. The findings from the report were used to support various European Union (EU) strategies, including the EU AI Act, the EU Strategy on the Rights on the Child, and the EU Strategy for Better Internet for Children.[47]

[45] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[46] Charisi, V., Chaudron, S., Di Gioia, R., Vuorikari, R., Escobar Planas, M., Sanchez Martin, J.I. and Gomez Gutierrez, E. (2022), Artificial Intelligence and the Rights of the Child : Towards an Integrated Agenda for Research and Policy, https://publications.jrc.ec.europa.eu/repository/handle/JRC127564
[47] European Commission (2022), Examining artificial intelligence technologies through the lens of children's rights, https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/examining-artificial-intelligence-technologies-through-lens-childrens-rights-2022-06-22_en

		• Develop content and materials for the awareness campaign, including educational resources, infographics, videos, and social media posts. • Finalize messaging and communication strategies to effectively reach target audiences and raise awareness on AI risks for vulnerable communities. **Long-Term:** • Launch the awareness campaign across ASEAN Member States, utilizing diverse communication channels to reach a wide audience. • Monitor campaign performance and effectiveness, gathering feedback from stakeholders and tracking key metrics such as audience reach and engagement. • Develop policy recommendations based on research findings and stakeholder insights to address AI risks and promote inclusive AI design and deployment. • Advocate for policy changes and implementation measures at regional and national levels to support the needs of vulnerable communities in the AI ecosystem. • Establish mechanisms for sustainability, ensuring ongoing awareness efforts and stakeholder engagement beyond the initial campaign period. • Continuously monitor AI developments and evolving risks, adapting awareness strategies and policy recommendations to address emerging challenges and opportunities.		

CROSS-CUTTING PILLAR 3: GOVERNANCE AND PARTICIPATION

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[48]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C3.1 Develop Secure and Trusted Data-Sharing Platforms to Enable Interoperable AI Systems**			
Objective(s)	• **Fostering Data-Driven Innovation:** Developing secure and trusted data-sharing platforms within the ASEAN region fosters data-driven innovation, and can lead to the development of AI applications and solutions that address key societal challenges, drive economic growth, and improve the quality of life for ASEAN citizens. • **Enabling Cross-Border Data Flows Within ASEAN**: Leverage existing ASEAN-wide data-protection and data-transfer frameworks to enable the free and secure flow of data across ASEAN borders and jurisdictions, thereby growing digital trade and improving opportunities for digital businesses in the region (ASEAN Data Management Framework, ASEAN Model Contractual Clauses for Cross Border Data Flows (MCCs), etc.). • **Promoting Regional Collaboration:** Secure and trusted data sharing platforms promote regional collaboration by facilitating collaborative AI projects, research initiatives, and industry partnerships across ASEAN member states.			
C3.1.1 Develop Secure and Trusted Data-Sharing Platforms	**Develop Secure and Trusted Data Sharing Platforms:** Establish trusted data sharing platforms or networks within the ASEAN region to facilitate secure and transparent exchange of data for AI projects. Implement robust data governance mechanisms, including data anonymization, encryption, and access controls, to protect the privacy and confidentiality of shared data.	**Short-Term:** • Assess the data sharing needs and priorities of ASEAN member states and key stakeholders, including government agencies, private sector organizations, and research institutions. • Develop a preliminary governance framework for secure and trusted data sharing platforms, outlining principles, policies, and procedures for data access, usage, and protection. • Identify technical requirements and standards for data anonymization, encryption, and access controls to ensure data security and privacy compliance. • Initiate the development of pilot data sharing platforms in selected ASEAN countries, focusing on testing technical functionalities and assessing usability. **Medium-Term:** • Deploy pilot data sharing platforms in selected ASEAN countries and sectors, allowing stakeholders to start sharing data for AI projects in a secure and trusted manner. • Evaluate the effectiveness of the pilot platforms in facilitating data sharing, ensuring data security, and addressing stakeholders' needs and concerns. • Based on the pilot results and stakeholder feedback, refine the governance framework for	General measures of progress include: • **Platform Development Progress:** Track the progress of platform development, including the design, implementation, and testing phases. Measure milestones achieved, such as the completion of technical specifications, establishment of infrastructure, and deployment of pilot platforms. • **Data Sharing Adoption Rate:** Monitor the adoption rate of data sharing platforms among ASEAN member states and key stakeholders. Measure the number of organizations and sectors participating in data sharing initiatives, as well as the volume and variety of data shared through the platforms. • **Data Security and Privacy Compliance:** Assess the level of compliance with data security and privacy standards within the data sharing platforms. Measure adherence to encryption protocols, data anonymization techniques, access controls, and other security	Estonia's X-road is an open-source software and solution that allows secure and trusted data exchange between public and private organizations in Estonia.[49] Under X-road, organizations can connect to the platform and exchange information on databases and registries.[50] As an open-source software, countries around the world are open to customizing X-road to their local structure.[51] In 2018, Finland adopted X-road and enabled border data exchange with Estonia. The two countries currently share data on mobility and taxation.[52]

[48] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[49] E-Estonia (2024), Interoperability services- X-Road, https://e-estonia.com/solutions/interoperability-services/x-road/
[50] Yogesh Hirdaramani (2024), Estonia's X-Road: data exchange in the world's most digital society, https://govinsider.asia/intl-en/article/estonias-x-road-data-exchange-in-the-worlds-most-digital-society
[51] E-Estonia (2024), Interoperability services- X-Road, https://e-estonia.com/solutions/interoperability-services/x-road/
[52] Yogesh Hirdaramani (2024), Estonia's X-Road: data exchange in the world's most digital society, https://govinsider.asia/intl-en/article/estonias-x-road-data-exchange-in-the-worlds-most-digital-society

		the data sharing platforms to enhance transparency, accountability, and compliance with data protection regulations. ● Scale up the deployment of secure and trusted data sharing platforms to additional ASEAN countries and sectors, expanding the reach and impact of data-driven AI projects. ● Promote the adoption and implementation of endorsed regional frameworks, including the ASEAN Data Management Framework and ASEAN Model Contractual Clauses for Cross Border Data Flows, to facilitate cross-border data flows in ASEAN. **Long-Term:** ● Establish a regional network of secure and trusted data sharing platforms across all ASEAN member states, enabling seamless data exchange for AI projects across borders. ● Enhance interoperability and compatibility among the data sharing platforms to facilitate cross-border data flows and collaboration on regional AI initiatives. ● Continuously monitor and evaluate the performance of the regional data sharing network, incorporating feedback from stakeholders, and adapting to evolving technological and regulatory landscapes. ● Share lessons learned and best practices from the implementation of secure and trusted data sharing platforms within ASEAN and beyond, contributing to global efforts to promote responsible data governance and AI innovation.	measures to ensure the protection of sensitive information. ● **Stakeholder Satisfaction:** Solicit feedback from stakeholders, including government agencies, industry partners, academic institutions, and civil society organizations, on their satisfaction with the usability, functionality, and security of the data sharing platforms. Measure stakeholder perceptions of platform effectiveness and impact on AI projects and initiatives.	

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[53]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C3.2 Enhance and Advance Multi-Stakeholder Dialogue on AI Governance**			
Objective(s)	• **Diverse Perspectives and Inclusive Dialogue:** By fostering multi-stakeholder dialogue on AI governance, ASEAN promotes inclusivity and embraces diverse viewpoints. These dialogues serve as valuable platforms for knowledge exchange and awareness-building, enriching the understanding of AI's impact across the region. Such dialogues may include, among others, key data-governance stakeholders such as the ASEAN Working Group on Digital Data Governance (WG-DDG) and the ASEAN Data Protection and Privacy Forum (DPPF), and be facilitated by the ASEAN Working Group on AI Governance (where relevant). • **Facilitating Informed Policymaking:** Enhancing multi-stakeholder dialogue on AI governance in ASEAN facilitates the sharing of knowledge, expertise, and experiences among stakeholders. This helps policymakers gain insights into the varied interests and challenges related to AI technologies within the region, and can contribute to a more informed and nuanced approach to AI governance in ASEAN.			
C3.2.1 Enhancing and Advance Multi-Stakeholder Dialogue on AI Governance	• **Interactive AI Governance Hubs:** Create digital platforms and forums such as a network of Responsible AI Institutes in ASEAN to enable stakeholders to access information, share feedback, and participate in discussions regarding responsible AI policies, regulations, and initiatives. Cultivate inclusive dialogue among policymakers, industry leaders, civil society, and citizens across ASEAN, fostering collaboration to shape accountable AI governance practices. • **Inclusive Stakeholder Engagement Events:** Host a series of inclusive stakeholder engagement events, including public forums, town hall meetings, and online consultations, specifically designed for the diverse ASEAN community. Conduct these events in various formats and locations, prioritizing accessibility for all, including marginalized groups and those in rural areas.	**Short-Term:** • Begin development of the interactive AI governance hubs such as a network of Responsible AI Institutes in ASEAN that focuses on creating user-friendly interfaces, multilingual support, and incorporating essential features for information sharing and feedback mechanisms. • Identify and map key stakeholders across ASEAN countries, including policymakers, industry leaders, civil society organizations, and citizens, to ensure broad representation in engagement events. • Plan and organize the first round of inclusive stakeholder engagement events, selecting formats and venues to maximize accessibility and participation. **Medium-Term:** • Launch the interactive AI governance hubs, making them accessible to stakeholders across ASEAN for information dissemination and engagement activities. • Host a series of inclusive stakeholder engagement events, including public forums, town hall meetings, and online consultations, to facilitate dialogue and collaboration on AI governance issues. • Gather feedback and insights from stakeholders during engagement events, focusing on identifying priorities, concerns, and recommendations for shaping accountable AI governance practices. **Long-Term:**	General measures of progress include: • **Platform Utilization:** Measure the level of utilization of the interactive AI governance hubs by stakeholders, including the frequency of visits, duration of engagement sessions, and the diversity of users accessing the platform. • **Feedback Collection:** Evaluate the quantity and quality of feedback received from stakeholders through the governance hubs and engagement events, including the number of suggestions, concerns, and recommendations provided. • **Stakeholder Participation:** Assess the level of participation and representation of diverse stakeholders in engagement events, including policymakers, industry representatives, civil society organizations, academia, and citizens from different demographics and geographical locations. • **Reach and Accessibility:** Determine the reach and accessibility of engagement events and governance hubs, including the number of participants, geographic coverage, and inclusivity in terms of language, disability accommodations, and digital literacy requirements. • **Knowledge Sharing:** Measure the dissemination and sharing of information, knowledge, and best	Under France's National AI Strategy, the French government established the French National Committee for Digital Ethics (FNCDE). The Committee consists of 27 members from the government, industry, civil society, and academia.[54] The FNDCE's responsibilities include submitting contributions on ethics and AI, as well as raising awareness and informing relevant stakeholders. It will undertake a series of hearing and consultations with stakeholders on the topic of AI and digital ethics.[55]

[53] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[54] AI-regulation.com (2024), The French National Committee for Digital Ethics, https://ai-regulation.com/the-french-national-committee-for-digital-ethics
[55] *Ibid.*

		• Continuously enhance and upgrade the interactive AI governance hubs to meet evolving stakeholder needs, technological advancements, and regional challenges within the ASEAN context. • Foster sustained engagement and dialogue among ASEAN stakeholders through the interactive AI governance hubs, fostering a culture of collaboration and mutual understanding in shaping accountable AI governance frameworks across the region. • Incorporate stakeholder feedback and recommendations in the formulation of impactful policies and regulations at both regional and national levels, thereby contributing to the discourse on responsible AI governance frameworks that acknowledge the diverse interests and priorities of the ASEAN community.	practices related to AI governance through the governance hubs and engagement events, including the number of resources accessed, downloads, and referrals.	

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[56]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C3.3 Continuously Review and Enhance the Roadmap and Ensure Its Implementation Is Aligned With the *ASEAN Guide on AI Governance and Ethics* and the *ASEAN Digital Economy Framework Agreement (DEFA)***			
Objective(s)	• **Ensuring Relevance and Effectiveness:** Regularly reviewing and updating the *ASEAN Responsible AI Roadmap (2025-2030)* ensures that it remains relevant and effective in guiding AI governance practices within the region. By periodically revisiting and revising the roadmap, ASEAN can ensure that it reflects the latest developments in AI technology, global best practices, and stakeholder priorities, thus enhancing its utility and impact. • **Promoting Continuous Improvement and Adaptation:** Support the ASEAN Working Group on AI Governance as it provides input to the reviewing and updating of the roadmap to foster a culture of continuous improvement and adaptation in AI governance practices across ASEAN member states. This iterative approach not only enhances the effectiveness of AI governance efforts but also demonstrates ASEAN's commitment to responsible and responsive policymaking in the dynamic field of AI. • **Enabling Alignment With Other Regional Initiatives/Frameworks on AI**: The implementation of the Roadmap should be done in alignment with the provisions and priorities expressed in the *ASEAN Digital Economy Framework Agreement (DEFA)*, the *ASEAN Guide on AI Governance and Ethics*, and the upcoming *Guidelines on the Development and Use of Generative AI in ASEAN*.			
C3.3.1 Continuously Review and Enhance the *ASEAN Responsible AI Roadmap (2025-2030)*	• **Establish Regional Review Framework:** Develop a standardized framework for conducting regular reviews of the ASEAN Responsible AI Roadmap, outlining consistent criteria, evaluation metrics, and timelines across member states. • **Promote Multi-Stakeholder Engagement:** Encourage active participation and feedback from diverse stakeholders across ASEAN, including technical experts, industry representatives, civil society organizations, and policymakers, to ensure comprehensive input during the review process. • **Review and Update the *ASEAN Responsible AI Roadmap (2025-2030)*:** Facilitate collaboration among ASEAN member states to review and update the Roadmap to reflect evolving technological landscapes, ethical considerations, and global best practices in the field of AI governance.	**Short-Term:** • Establish working groups or committees to develop the initial framework for the *Regional Review of the ASEAN Responsible AI Roadmap (2025-2030)*. • Identify relevant stakeholders and technical experts to participate in the review process. • Conduct consultations with member states and stakeholders to gather input on criteria, evaluation metrics, and timelines for the draft Regional Review Framework. • Finalize the *Regional Review Framework for the ASEAN Responsible AI Roadmap (2025-2030)*, incorporating feedback from member states and stakeholders. **Medium-Term:** • Initiate the first round of reviews based on the finalized Regional Review Framework, with member states conducting comprehensive assessments of the roadmap's effectiveness and relevance. • Evaluate the outcomes of the initial review cycle and identify areas for improvement or refinement in the review process. • Facilitate stakeholder consultations and workshops to gather feedback on the current Roadmap, emphasizing the importance of aligning with global best practices and addressing emerging ethical considerations. • Finalize the proposed updates and changes to the Roadmap, incorporating feedback from	General measures of progress include: • **Extent of Stakeholder Engagement:** Assess the level of engagement and participation of key stakeholders, including ASEAN member states, technical experts, industry representatives, civil society organizations, academic institutions, and international partners, in the review process. • **Timely Finalization of the Revised Roadmap:** Monitor the timeliness of finalizing the revised version of the Roadmap following the completion of the review process. This measure assesses the efficiency and effectiveness of the review process in terms of producing actionable outcomes within the defined timeframe, ensuring that the updated Roadmap remains relevant and responsive to evolving needs and priorities. • **Continuous Improvement:** Track efforts to continuously improve the review process and the Roadmap itself based on lessons learned, feedback received, and changes in the AI landscape over time.	In 2019, the Canadian government released the Directive on Automated Decision-making. The Directive entails a range of mandatory requirements on the responsible use of AI by federal agencies and institutions. These requirements include algorithmic assessment, transparency, quality assurance, amongst others.[57] To keep up with technological changes, the Treasury Board of Canada Secretariat Canada is required to review the Directive every 6 months.[58] The review's objective is to take stock of the current state of the Directive, and identify new challenges, gaps, and problems with the content. It further seeks to align with changes in AI regulations in Canada and across the world.[59]

[56] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[57] OECD (2023), "The state of implementation of the OECD AI Principles four years on", , https://doi.org/10.1787/835641c9-en.
[58] Government of Canada (2023), Archived [2023-04-24] - Directive on Automated Decision-Making, www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32746&section=html
[59] GC Wiki (2023), Third Review of the Directive on Automated Decision-Making, https://wiki.gccollab.ca/index.php?title=Third_Review_of_the_Directive_on_Automated_Decision-Making&mobileaction=toggle_view_desktop

		member states and stakeholders. Launch the second edition of the Roadmap. **Long-Term:** ● Conduct comprehensive reviews of the entire Roadmap at regular intervals, incorporating feedback from stakeholders and insights from emerging technological and ethical developments. ● Continuously update and refine the Roadmap to reflect evolving technological landscapes, ethical considerations, and global best practices, ensuring that it remains a dynamic and responsive guide for promoting responsible AI within the ASEAN region.		

CROSS-CUTTING PILLAR 4: INTEGRATION AND COOPERATION

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[60]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C4.1 Advance Regional Capacity-Building and Knowledge-Sharing**			
Objective(s)	• **Build Regional Capacity:** Enhance regional capacity for responsible AI by equipping regional stakeholders with the knowledge and skills to implement responsible AI practices. • **Foster Sustainable Capacity-Building:** Empowering local experts with essential knowledge, skills, and resources to independently conduct workshops within their countries cultivates a self-sustaining ecosystem of expertise, ensuring the long-term impact of capacity-building initiatives. • **Facilitate Knowledge Sharing:** Foster the exchange of expertise, best practices, and lessons learned on AI governance and implementation among ASEAN member states through regional knowledge-sharing forums.			
C4.1.1 Advance Regional Capacity-Building and Knowledge-Sharing	• **Regional Capacity Building Workshops:** Facilitate workshops, training programs, and knowledge-sharing sessions at the regional level to enhance understanding and proficiency in implementing responsible AI practices across diverse stakeholders. • **Train-the-Trainer Empowerment:** Provide local experts with the necessary knowledge, skills, and resources to independently conduct workshops within their countries, ensuring sustainability and long-term impact in capacity-building initiatives.	**Short-Term:** • Conduct a needs assessment to identify knowledge gaps and priorities for regional stakeholders regarding responsible AI practices. • Develop workshop curriculum and materials tailored to the needs identified in the assessment. • Secure funding and partnerships for hosting the first regional capacity building workshop. • Conduct the first regional workshop with participation from diverse stakeholders (government, industry, academia, civil society). **Medium-Term:** • Expand the scope of regional capacity building workshops to cover advanced topics and emerging trends in responsible AI, such as AI ethics, bias mitigation, and transparency. • Collaborate with subject matter experts and partner organizations to develop specialized training modules tailored to the specific needs of different stakeholder groups. • Track and evaluate the effectiveness of capacity building programs based on participant feedback and knowledge retention. **Long-Term:** • Implement train-the-trainer programs to empower local experts from member countries with the skills and resources needed to	General measures of progress include: • **Number of regional capacity building workshops conducted:** Track the number of regional capacity building workshops successfully held within the targeted timeframe. • **Participant diversity:** Measure the diversity of participants attending the workshops (government, industry, academia, civil society) to assess inclusivity. • **Impact of regional capacity building workshops:** Consider implementing pre- and post-workshop assessments or knowledge retention surveys to gauge the effectiveness of workshops in imparting knowledge on responsible AI practices. • **Number of Local Trainers Empowered:** Measure the number of local experts who have been trained to independently conduct workshops within their countries.	The WHO Regional Office for Africa (AFRO), together with the United States Agency for International Development (USAID) and the International Telecommunications Union (ITU), organized a capacity building workshop on ethics and governance for use of AI for health in Africa.[61] The workshop targeted government representatives from the Ministries of Health and ICT. It aims at identifying opportunities and challenges of using AI in digital health and promote regional dialogue on responsible use of AI in health. It is also expected to establish an online module on "ethics and governance of AI for health".[62]

[60] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[61] World Health Organization, Africa Region (2023), Capacity Building Workshop on Ethics and Governance for use of Artificial Intelligence for Health in countries, www.afro.who.int/media-centre/events/capacity-building-workshop-ethics-and-governance-use-artificial-intelligence
[62] *Ibid.*

		independently conduct capacity building workshops within their respective countries. ● Provide ongoing support and mentorship to trained trainers to ensure the quality and sustainability of capacity building initiatives at the national level. ● Develop a sustainable funding model to support ongoing capacity building programs. ● Conduct regional conferences to showcase best practices from capacity building programs and foster collaboration.		
C4.1.2 Facilitate Regional Knowledge-Sharing Forums	**Facilitate Knowledge Sharing Forums:** Organize multi-stakeholder regional dialogues and collaborative initiatives aimed at exchanging best practices, successful AI use cases, experiences, and emerging developments.	**Short-Term:** ● Identify key stakeholders from regional governments, industry, academia, and civil society for participation in the knowledge-sharing forums. ● Determine the themes and topics to be addressed in the forums based on current trends and priorities in AI. ● Secure necessary resources, such as venue, technology, and facilitation support. **Medium-Term:** ● Host the multi-stakeholder regional dialogue, bringing together participants from diverse sectors. Facilitate discussions on best practices, successful AI use cases, experiences, and emerging developments. Encourage active participation and exchange of ideas among participants through roundtable discussions, workshops, etc. ● Gather feedback from participants to assess the effectiveness and relevance of the knowledge-sharing forum. ● Evaluate the outcomes and identify areas for improvement in future forums. **Long-Term:** ● Align the knowledge-sharing forums with regional AI initiatives and frameworks, contributing to broader efforts towards responsible AI governance and development. ● Institutionalize the knowledge-sharing forums as a recognized platform for ongoing dialogue and collaboration on AI-related issues. ● Measure the impact of the knowledge-sharing forums on the adoption of best practices, policy	General measures of progress include: ● **Attendance and Participation Rates:** Measure the number of participants attending the forums, as well as the diversity of stakeholders represented, including government agencies, industry players, academia, and civil society. ● **Feedback from Participants:** Gather feedback from participants to evaluate their satisfaction with the forums, including the perceived value of the information shared, the effectiveness of the format and facilitation, and suggestions for improvement. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	In July 2023, China organized the first China-ASEAN Artificial Intelligence Cooperation. The forum was attended by government officials, industry representatives and AI experts from China and ASEAN.[63] The conference focuses on various themes on AI, including business opportunities in AI, and areas of collaboration between the two parties to boost AI development and adoption in ecommerce, finance, education, amongst others.[64] In addition to networking and information exchange, the "Artificial Intelligence Development and Cooperation Initiative with ASEAN" was published.[65] The above led to the organization of further activities, including the "ASEAN-China Innovation and Entrepreneurship Competition and the inaugural meeting of the China-ASEAN Science and Technology Cooperation Center for Public Health".[66]

[63] The China Project (2023), AI is the Future of the China-ASEAN Tech Partnership, https://thechinaproject.com/2023/07/27/ai-is-the-future-of-the-china-asean-tech-partnership
[64] *Ibid.*
[65] Ministry of Foreign Affairs of the People's Republic of China (2023), Progress Report on China's Efforts to Build a Peaceful, Safe and Secure, Prosperous, Beautiful and Amicable Homeland, www.mfa.gov.cn/eng/wjb_663304/zzjg_663340/yzs_663350/dqzzywt_663588/202309/t20230906_11139365.html
[66] *Ibid.*

		development, and innovation in AI within the region.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[67]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C4.2 Multiply Cross-Border Collaboration Initiatives on AI and AI Governance**			
Objective(s)	• **Enhancing Regional Innovation:** By facilitating cross-border AI innovation networks and fostering joint research initiatives, ASEAN can harness the collective expertise and resources of member states to drive innovation in key AI domains, enhancing the region's competitiveness in the global AI landscape. • **Addressing Regional Challenges:** ASEAN can leverage AI innovations from collaborative research initiatives to address pressing regional challenges such as healthcare, agriculture, environmental sustainability, and urban development. By promoting cross-border collaboration and the translation of research findings into practical applications, these initiatives facilitate the implementation of AI solutions that have tangible benefits for communities across ASEAN, improving quality of life and fostering inclusive and sustainable growth.			
C4.2.1 Facilitation of Cross-Border AI Innovation Networks	**Facilitation of Cross-Border AI Innovation Networks:** Facilitate the formation of cross-border AI innovation networks within ASEAN to promote collaboration and knowledge exchange among AI researchers, start-ups, and industry players. This can support the development of innovative AI solutions that address regional challenges and contribute to sustainable economic growth.	**Short-Term:** • Identify key stakeholders and potential partners across ASEAN member states interested in participating in cross-border AI innovation networks. • Establish communication channels and platforms for stakeholders to connect, share ideas, and initiate collaborations. • Host introductory meetings or workshops to introduce stakeholders to the concept of cross-border AI innovation networks and gauge interest. **Medium-Term:** • Formalize partnerships and agreements among stakeholders to solidify the structure and objectives of cross-border AI innovation networks. • Facilitate the exchange of expertise, resources, and best practices among participants through workshops, seminars, and collaborative projects. • Showcase successful collaborations and innovative AI solutions developed through the networks at regional events and conferences. **Long-Term:** • Expand the reach and impact of cross-border AI innovation networks by attracting additional participants and fostering deeper collaborations. • Establish mechanisms for ongoing evaluation and feedback to continuously improve the effectiveness and relevance of the networks. • Promote the scalability and sustainability of successful AI innovations developed through the	General measures of progress include: • **Network Growth and Participation:** Measure the number of stakeholders and organizations actively participating in cross-border AI innovation networks over time. An increase in the number of participants indicates growing interest and engagement in collaborative efforts within ASEAN. • **Collaborative Projects and Initiatives:** Track the number and scope of collaborative projects and initiatives initiated through the networks. Successful partnerships and joint ventures demonstrate the effectiveness of the networks in facilitating cross-border collaboration and knowledge exchange. • **Innovative AI Solutions Developed:** Monitor the development and implementation of innovative AI solutions that address regional challenges and contribute to sustainable economic growth. The successful deployment of such solutions demonstrates the practical impact and effectiveness of cross-border AI innovation networks. • **Visibility and Recognition:** Evaluate the visibility and recognition of the networks within ASEAN and beyond. Increased recognition from stakeholders, policymakers, and industry players indicates the networks' growing influence and	The Quadrilateral Security Dialogue (QUAD) released the Quad Principles on Technology Design, Development, Governance, and Use in 2021.[68] The principles outline the commitment of QUAD countries to facilitate exchange of researchers and highly skilled professionals to collaborate on science and technology.[69] Further, QUAD countries are committed to developing shared research projects, and shared R&D agenda.[70]

[67] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[68] The White House (2021), Quad Principles on Technology Design, Development, Governance, and Use, www.whitehouse.gov/briefing-room/statements-releases/2021/09/24/quad-principles-on-technology-design-development-governance-and-use/
[69] *Ibid.*
[70] *Ibid.*

		networks, contributing to long-term economic growth and development in ASEAN.	contribution to the regional AI ecosystem.	
C4.2.2 Collaborative Research and Technology Transfer Projects	• **Fostering Joint Research Initiatives:** Foster the establishment of joint research initiatives focusing on key AI domains such as machine learning, natural language processing, and computer vision. These initiatives should promote interdisciplinary collaboration and address regional challenges through innovative AI solutions. • **Facilitating Technology Transfer Programs:** Support technology transfer programs that facilitate the voluntary sharing of AI knowledge, tools, and expertise, on mutually agreed terms, among ASEAN countries. This involves promoting partnerships between research institutions, industry players, and government agencies to translate research findings into practical applications that benefit the ASEAN region.	**Short-Term:** • Identify priority areas of common interest in AI R&D for potential collaboration across ASEAN. • Facilitate the formation of collaborative networks and consortia among research institutions, industry partners, and government agencies to initiate joint research initiatives in priority AI domains. • Conduct needs assessments and stakeholder consultations within ASEAN to identify specific regional challenges and opportunities where AI solutions can make a significant impact, setting the stage for targeted collaborative efforts. **Medium-Term:** • Initiate joint research projects in machine learning, natural language processing, computer vision, and other relevant AI domains, fostering interdisciplinary collaboration and knowledge exchange among member states. • Develop voluntary technology transfer mechanisms, including licensing agreements, collaborative research agreements, and innovation hubs, to facilitate the voluntary transfer of AI knowledge and tools on mutually agreed terms among member states. • Implement capacity building programs and training workshops to enhance the AI research and development capabilities of researchers, engineers, and policymakers across ASEAN member states. **Long-Term:** • Achieve significant milestones in joint research projects, demonstrating tangible outcomes and innovations that address regional challenges and contribute to the advancement of AI technologies. • Establish sustainable collaboration frameworks and mechanisms to ensure the continued exchange of AI knowledge, expertise, and resources among ASEAN countries beyond individual projects, fostering long-term partnerships and collective progress. • Conduct impact assessments of joint research initiatives and voluntary technology transfer programs within ASEAN to evaluate their	General measures of progress include: • **Number of Collaborative Research Projects Initiated:** Track the number of joint research projects launched within ASEAN member states, indicating the level of collaboration and knowledge exchange occurring in priority AI domains. • **Development of Technology Transfer Mechanisms:** Monitor the establishment and utilization of voluntary technology transfer mechanisms, such as licensing agreements and collaborative research agreements, to assess the effectiveness of knowledge and tool sharing among ASEAN countries. • **Research Milestones Achieved:** Monitor the achievement of significant milestones in joint research projects within ASEAN, demonstrating tangible outcomes and innovations that address regional challenges and contribute to the advancement of AI technologies.	France launched the BigScience project in 2021. The project was a one-year international collaboration project which invited more than 800 researchers to contribute to projects on Large Language Model (LLM) and datasets for France and other languages in the EU.[71] As part of the project, technical information, issues, and approaches used to develop the LLM and datasets were made publicly available to France and other European countries involved.[72] The project also contributed to discussions of the legal and ethical issues of LLM and datasets, and models and tools that could be developed to mitigate the impact of the issues identified.[73]

[71] OECD.AI Policy Observatory (2024), HPC Support to NLP BigScience Workshop, https://oecd.ai/en/dashboards/policy-initiatives/http:%2F%2Faipo.oecd.org%2F2021-data-policyInitiatives-27291
[72] *Ibid.*
[73] *Ibid.*

		effectiveness and identify opportunities for scaling up successful initiatives to a larger regional scale, maximizing their impact on regional development and innovation.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[74]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C4.3 Sustain Global Engagement and Collaboration for Responsible AI**			
Objective(s)	• **Multi-Stakeholder Knowledge Exchange and Learning:** Actively engaging in global forums dedicated to AI ethics and governance facilitates the exchange of knowledge, promotes dialogue, and ensures that ASEAN remains informed about emerging trends and best practices in the AI landscape. It also ensures that the voice of a wide range of stakeholders – from users to deployers, from major technology firms to smaller creators – is heard. This is especially important when it comes to addressing the emerging copyright and intellectual property concerns that generative AI is surfacing. • **Inclusive Engagement in Global Standards Development:** By advocating for inclusivity and representation of all AMS in global AI standards discussions, ASEAN ensures that its diverse perspectives and interests are taken into account. This approach contributes to the development of a more informed and inclusive global framework for AI standards. • **Collaborative Research and Innovation:** Initiating collaborative research projects with international partners enables ASEAN to harness diverse expertise and resources, fostering innovation and advancement in ethical AI development. Through collaborative efforts, the region can address common challenges and contribute to the global advancement of responsible AI practices.			
C4.3.1 Engagement in International Forums on Responsible and Ethical AI	• **Engagement in International Forums:** Actively participate in global forums and platforms dedicated to AI ethics and governance, such as the United Nations' AI for Good Global Summit and the OECD AI Policy Observatory. This engagement facilitates knowledge exchange, promotes dialogue, and ensures ASEAN's voice is heard in shaping international standards and norms for ethical AI development. • **Advocacy for Inclusivity and Representation in Global AI Governance Discussions**: Advocate for inclusivity and representation in global AI governance discussions, ensuring that the perspectives and interests of ASEAN countries, particularly those from diverse socio-economic backgrounds, are adequately represented and considered in the formulation of international AI standards and norms.	**Short-Term:** • Establish ASEAN representation in key global forums on AI ethics and governance, ensuring attendance and active engagement in discussions. • Initiate capacity building programs within ASEAN countries to raise AMS' awareness and understanding of global AI governance frameworks and principles. • Initiate working groups within ASEAN to strategize engagement in international AI governance discussions. These groups will prioritize key areas for ASEAN involvement, ensuring diverse representation to advocate for inclusivity and participation in global AI governance dialogues. **Medium-Term:** • Forge collaborative frameworks with other regional and international organizations to amplify ASEAN's influence in global AI governance. • Publish reports and findings from ASEAN's participation in global forums, disseminating insights and recommendations to inform regional AI governance strategies. **Long-Term:** • Establish ASEAN as a key member in contributing to the global discourse on AI governance, with ASEAN countries playing pivotal roles in shaping international AI standards and norms.	General measures of progress include: • **Representation Metrics:** Track the level of ASEAN representation and participation in global forums and platforms dedicated to AI ethics and governance, ensuring active engagement and contributions. • **Leadership Recognition:** Measure global recognition of ASEAN's contributions to the global AI governance through leadership positions, roles in shaping international standards, and acknowledgment from key stakeholders.	The United States works extensively with international AI communities to participate in responsible AI framework development. The National Telecommunications and Information Administration (NTIA), NIST and the International Trade Administration participate actively in international settings to discuss responsible AI governance frameworks. These include G7, G20, OECD, and the United Nations.[75] In particular, all three agencies are involved in *OECD Working Party on AI Governance* to contribute to dialogues on the foundation and building blocks of international responsible AI governance frameworks.[76] Likewise, the United States *International Cyberspace & Digital Policy Strategy* introduces the concept of "Digital Solidarity" to highlight the importance of shared objectives and common interests for countries/economies to advance AI in an open, transparent, and inclusive manner.[77]

[74] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[75] OECD.AI Policy Observatory (2023), The United States works with domestic and international AI communities to establish frameworks that advance trustworthy AI for all, https://oecd.ai/en/wonk/united-states-ai-for-all-policy
[76] *Ibid.*
[77] U.S. Department of State (2024) United States International Cyberspace & Digital Policy Strategy, www.state.gov/united-states-international-cyberspace-and-digital-policy-strategy

C4.3.2 Inclusive Engagement in the Development and Implementation of International AI Standards	**Inclusive ASEAN Engagement in the Development of Global AI Standards:** Foster active and collaborative participation from all 10 AMS in shaping global AI standards, leveraging the expertise and resources of local, regional, and international stakeholders.	**Short-Term:** • Identify and reach out to key ASEAN working groups and policymakers from all 10 AMS to contribute to the development of global AI standards. • Engage with stakeholders from government, industry, academia, and civil society to gather insights and priorities for ASEAN's participation in global AI standards development. • Identify areas of expertise and resources within ASEAN that can contribute effectively to the development of global AI standards. **Medium-Term:** • Launch collaborative projects among ASEAN member states to address specific aspects of AI standards development, such as data privacy, algorithm transparency, and ethical considerations. For example, AMS could work together to develop an ASEAN AI Standards and Accreditation System to identify AI standards that are relevant to the ASEAN region. • Forge partnerships with international organizations, standards bodies, and experts to facilitate knowledge exchange and capacity building in AI standards development. • Conduct research and analysis to identify gaps and opportunities in existing global AI standards frameworks and develop recommendations for ASEAN's contributions. **Long-Term:** • Develop concrete proposals and contributions from ASEAN to be submitted to relevant global AI standards development bodies and initiatives. • Advocate for the adoption and integration of ASEAN's contributions in global AI standards discussions, highlighting the region's unique perspectives and experiences. • Maintain ongoing engagement with global AI standards development processes, ensuring that ASEAN's interests and priorities are represented and considered in the evolution of global standards.	General measures of progress include: • **Identification of ASEAN Expertise:** Evaluate the identification and mapping of expertise and resources within ASEAN that can contribute to global AI standards development, including technical knowledge, research capabilities, and policy expertise. • **Initiation of Collaborative Projects:** Monitor the initiation and progress of collaborative projects among ASEAN member states aimed at addressing specific aspects of AI standards development. • **Partnership Formation:** Track the establishment of partnerships with international organizations, standards bodies, and experts to facilitate knowledge exchange and capacity building in AI standards development. • **Research and Analysis Outputs:** Assess the quality and relevance of research and analysis conducted to identify gaps and opportunities in global AI standards frameworks, as well as the development of recommendations for ASEAN's contributions. • **ASEAN's Contributions to Standards Development:** Measure progress in the drafting and refinement of concrete proposals and contributions from ASEAN to be submitted to relevant global AI standards development bodies and initiatives.	In 2023, Japan announced the establishment of the AI Strategy Council, which consists of AI experts and government representatives.[78] The objective of the AI advisory council is to discuss pertinent issues concerning AI, such as personal data protection and copyright issues. Additionally, the Council is expected to take the lead on international discussion on global AI standards and frameworks.[79]
C4.3.3 International Research Initiatives	**International Research Initiatives:** Initiate collaborative research projects and initiatives among ASEAN member states and international partners to advance ethical AI development. These initiatives will focus on areas such as AI ethics, governance	**Short-Term:** • Identify key focus areas within AI ethics, governance, and responsible deployment for initial joint research initiatives with international partners.	General measures of progress include: • **Number of Joint Research Initiatives:** Track the number of collaborative research projects initiated among ASEAN member states and	The European Research Executive Agency (REA) is a research agency under the European Commission. The REA administers funding from the Horizon 2020 and the Horizon

[78] OECD (2023), The state of implementation of the OECD AI Principles four years on, https://doi.org/10.1787/835641c9-en
[79] Chambers and Partners (2023), Artificial Intelligence 2023- Japan, https://practiceguides.chambers.com/practice-guides/artificial-intelligence-2023/japan/trends-and-developments/O13573

	frameworks, and responsible AI deployment strategies, leveraging diverse expertise and resources from across the region.	• Organize workshops and brainstorming sessions to bring together researchers and experts to outline research objectives and methodologies for collaborative projects. **Medium-Term:** • Establish agreements and frameworks to initiate joint research projects on ethical AI among ASEAN member states and international partners. • Begin specific collaborative research endeavors focusing on identified priority areas, with teams comprising experts from ASEAN countries and international partners. • Facilitate regular exchanges of findings, insights, and best practices among research teams through workshops, conferences, and online platforms. • Disseminate research outputs through academic publications, policy briefs, and reports to share knowledge and contribute to the global discourse on ethical AI. **Long-Term:** • Formalize and institutionalize collaborative research networks on responsible AI within ASEAN, establishing mechanisms for sustained cooperation and knowledge-sharing. • Expand the scope of joint research initiatives to cover emerging issues and evolving challenges in ethical AI, adapting to the evolving needs of ASEAN and the global AI community. • Translate research findings into actionable policy recommendations and industry best practices to guide ethical AI development and deployment across ASEAN and beyond.	international partners focused on ethical AI development. • **Research Output and Impact:** Evaluate the quality and impact of research outputs, such as publications, policy recommendations, and technological advancements, resulting from joint research endeavors. A useful tool to track AI research output is the Emerging Technology Observatory's Country Activity Tracker (CAT) for AI, which tracks global research, patenting, and investment in AI and its applications with its dashboard.[80] • **Participation and Engagement:** Monitor the level of participation and engagement of regional and international stakeholders, including governments, research institutions, universities, and international partners, in joint research initiatives on ethical AI.	Europe programs and disperse them to research projects across Europe.[81] At present, the REA manages more than 1000 projects on AI and AI tools.[82] Some of the research areas covered include AI ethics, and the deployment of AI in health, environmental protection, democracy, and education.[83] The contributions of the private sector should also be recognized and leveraged where necessary. For example, Google's *AI Opportunity Agenda for ASEAN* outlines several recommendations that may support AMS as they grow the scope, scale, and impact of their efforts around infrastructure, skilling, and accessibility.[84]

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[85]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**C4.4 Actively Facilitate/Participate in Regional Forums and Initiatives on AI Governance**			

[80] ETO (2024) Country Activity Tracker (CAT): Artificial Intelligence, Country Activity Tracker: Artificial Intelligence (eto.tech)
[81] European Commission (2024), Facing the future: AI-driven research projects overcoming real-life challenges, https://rea.ec.europa.eu/research-and-artificial-intelligence_en
[82] *Ibid.*
[83] European Commission (2024), Facing the future: AI-driven research projects overcoming real-life challenges, https://rea.ec.europa.eu/research-and-artificial-intelligence_en
[84] Google (2024) An AI Opportunity Agenda for ASEAN, https://services.google.com/fh/files/misc/google_ai_opportunity_agenda_asean_final.pdf
[85] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.

Objective(s)	• **Shape Regional Policy Development:** AMS should actively participate in regional forums and ASEAN Working Group on AI Governance meetings and contribute insights, perspectives, national experiences, and best practices to promote the implementation of the AI governance principles in the *ASEAN Guide on AI Governance and Ethics*. • **Curate and Document Use Cases:** AMS can collaborate to compile a comprehensive compendium of use cases highlighting how organizations across various sectors in ASEAN have implemented or aligned their AI governance practices with the ASEAN Guide on AI Governance and Ethics. This repository of use cases can provide insights into the practical application of responsible AI principles in different contexts and industries. • **Shape Regional Generative AI Governance Landscape:** AMS can jointly develop regional guidelines for generative AI that address its unique risks and challenges for the region.			
C4.4.1 Active Engagement in Regional Forums on AI Governance	• **Active Engagement in Regional Forums:** Engage proactively in regional forums, such as ASEAN Working Group on AI Governance meetings and conferences to contribute insights, perspectives, national experiences, and best practices. • **Case Study Compilation:** Contribute to the compendium of case studies that demonstrate how organizations and/or government agencies have aligned/implemented their AI governance practices with the *ASEAN Guide on AI Governance and Ethics* and tailored the Guide to their industry needs and nature of business and benefited from the responsible use of AI.	**Short-Term:** • Designate representatives to actively engage and contribute insights, perspectives, and national experiences. • Initiate collaboration with relevant stakeholders to compile case studies demonstrating alignment with ASEAN Guide on AI Governance and Ethics. • Gather information on organizations and government agencies that have implemented responsible AI practices and benefited from them. **Medium-Term:** • Actively engage in regional forums, sharing insights on national experiences and best practices in the implementation of responsible AI governance practices in various sectors • Finalize the compilation of case studies showcasing successful alignment with the ASEAN Guide on AI Governance and Ethics. **Long-Term:** • Publish the compendium of AI case studies for dissemination among stakeholders in the region. • Maintain active participation in regional forums and working groups, ensuring ongoing contribution of insights and experiences.	General measures of progress include: • **Representation in ASEAN Working Group on AI Governance:** Monitor the country's active participation through its representative in the ASEAN Working Group on AI Governance. • **Participation Rate in Regional Forums:** Gauge the country's engagement in regional AI forums by tracking the frequency of attendance and the degree of involvement in discussions and initiatives. • **Contribution to Case Study Compilation:** Track the number of case studies demonstrating alignment with the *ASEAN Guide on AI Governance and Ethics* contributed to the compendium. Monitor the diversity of sectors and organizations represented in the case studies.	Singapore has been actively engaging in regional dialogues, meetings, and conferences on AI governance. As the rotating chair of ASEAN Digital Ministers' Meeting (ADGMIN) and other Related Meetings, Singapore hosted the 4th ADGMIN with participations from ten ASEAN member states, as well as representatives from Japan, South Korea, the United States, and the European Union.[86] During the meeting, the ASEAN Guide on AI Governance and Ethics was launched. In the Guide, use cases from Singapore (e.g., Smart Nation Group, Ministry of Education) were cited to demonstrate components of the Guide, and how different governance measures can be incorporated in AI design, development, and deployment.[87] Further, ASEAN member states also agreed to the Singapore Declaration, which outlines the formation of the ASEAN Working Group on AI Governance to enhance collaboration in AI governance frameworks.[88]
C4.4.2 Development of *ASEAN Governance Guidelines for Generative AI*	**Active Participation in Shaping the *ASEAN Governance Guidelines for Generative AI* (currently being finalized, to be published in 2024):** Contribute to the development of regional governance guidelines for generative AI based on the current ASEAN AI Governance framework.	**Short-Term:** • Identify key stakeholders involved in the development of regional governance guidelines for generative AI. • Provide input, insights, and perspectives on the specific considerations and challenges related to generative AI technologies.	General measures of progress include: • **Quality and Depth of Country-Specific Input:** Assess the depth and quality of the country's input, encompassing specific challenges, potential applications, and ethical considerations relevant to Generative AI.	In March 2024, the European Commission published the Guidelines on the Responsible Use of Generative AI in Research.[89] The Guidelines were developed in collaboration with the European Research Agency Forum representatives, European Union

[86] Ministry of Communications and Information (2024), Singapore chairs 4th ASEAN Digital Ministers Meeting, www.mci.gov.sg/media-centre/press-releases/singapore-chairs-4th-admin-meeting/
[87] ASEAN (2024), ASEAN Guide on AI Governance and Ethics, https://asean.org/wp-content/uploads/2024/02/ASEAN-Guide-on-AI-Governance-and-Ethics_beautified_201223_v2.pdf
[88] ASEAN (2024), Singapore Declaration, https://asean.org/wp-content/uploads/2024/02/ENDORSED-Singapore-Declaration_30-Jan-2024-CLN.pdf
[89] European Commission (2024), Guidelines on the responsible use of generative AI in research developed by the European Research Area Forum https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/guidelines-responsible-use-generative-ai-research-developed-european-research-area-forum-2024-03-20_en

		• Provide country-specific insights, data, and research findings on generative AI technologies, including their potential applications, risks, and ethical implications. **Medium-Term:** • Conduct preliminary analysis to identify gaps and areas where the ASEAN framework needs to be adapted or expanded to address generative AI. • Collaborate with other ASEAN member states and stakeholders to draft the regional governance guidelines for generative AI. • Contribute sections or proposals to the guideline document, ensuring alignment with the overarching principles of the ASEAN AI Governance framework. **Long-Term:** • Finalize the regional governance guidelines for generative AI based on feedback received during the consultation process. • Support in the dissemination of the ASEAN Governance Guidelines for Generative AI to ensure widespread awareness and adoption of the guidelines among stakeholders across the ASEAN region. • Identify pilot projects or use cases to test the feasibility and effectiveness of the proposed guidelines for generative AI.	• **Active Participation and Collaboration:** Monitor the country's level of engagement throughout the development process of the regional guidelines. This includes participation in stakeholder meetings, joint drafting efforts, and providing constructive feedback on the draft guidelines.	Member States, Horizon Europe associated countries, and other research and innovation stakeholders.[90] It aims to offer clear guidance to researchers, research organizations, and funding bodies regarding the utilization of generative AI tools in research. It also explores how these tools can be leveraged while considering privacy, confidentiality, and intellectual property rights.[91]

[90] European Commission (2024), Guidelines on the responsible use of generative AI in research developed by the European Research Area Forum https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/guidelines-responsible-use-generative-ai-research-developed-european-research-area-forum-2024-03-20_en
[91] *Ibid.*

TARGETED ROADMAP – TARGETED ACTIONS & PRIORITIES

This section leverages the findings of the readiness assessment and provides targeted action areas that can be turned into actionable steps by each AMS, within the parameters of their national needs, priorities, and capabilities.

Where possible, each action area comprises objectives, target areas, milestones, responsible parties, measures of progress, and international best practices/case studies that are appropriate for each readiness tier.

For each readiness tier, the steps and actions are structured around the four key pillars identified as central to the maturation of responsible AI ecosystems:

1. **Targeted Pillar 1: Internal Governance Structures and Measures** – Promote awareness and support for the development and implementation of national AI policies, frameworks, strategies, and regulations.

2. **Targeted Pillar 2: Skills & Knowledge for Responsible, AI-Augmented Decision-Making** – Promote and strengthen skills, capabilities, and knowledge-sharing among the public and private sectors, educational institutions, and civil society to develop and deploy AI responsibly.

3. **Targeted Pillar 3: Risk Mitigation, Monitoring Mechanisms, and Operations Management** – Strengthen and promote the use of risk mitigation and monitoring and evaluation tools across the public and private sectors to mitigate risks and biases, minimize harm from AI, and align with responsible AI principles.

4. **Targeted Pillar 4: Stakeholder Coordination & Regional Cooperation on AI** – Promote regional efforts to develop common principles and a guiding approach to operationalizing responsible AI and align national efforts with the work of the ASEAN Working Group on AI Governance.

OVERVIEW OF TARGETED ROADMAP ACTIONS

The action areas in the four pillar roadmaps are developed in alignment with the recommendations outlined in the Research Brief, as well as the national and regional-level recommendations in the *ASEAN Guide on AI Governance and Ethics*. Table 5 provides an overview of the key action areas across the tiered roadmaps.

Note: In the first instance, ASEAN Digital Ministers' and Senior Officials (ADGMIN / ADGSOM) and the ASEAN Working Group on AI Governance are envisioned as the main responsible parties for the coordination/alignment of these targeted activities. Where necessary/relevant, other sectoral bodies under the AEC may be involved with the implementation of the Roadmap.

Table 5. Overview of Key Targeted Action Areas for AMS

	TARGETED PILLAR 1: INTERNAL GOVERNANCE STRUCTURES AND MEASURES	TARGETED PILLAR 2: SKILLS & KNOWLEDGE FOR RESPONSIBLE, AI-AUGMENTED DECISION-MAKING	TARGETED PILLAR 3: RISK MITIGATION, MONITORING MECHANISMS, AND OPERATIONS MANAGEMENT	TARGETED PILLAR 4: STAKEHOLDER COORDINATION & REGIONAL COOPERATION ON AI
ADVANCED	A1.1 Review and adapt AI governance frameworks to address evolving AI issues and developments A1.2 Develop policy guidelines to promote data sharing across government agencies	A2.1 Develop targeted provisions/regulations for invisible/at-risk populations A2.2 Promote digital inclusion and accessibility in AI system design A2.3 Enhance public sector AI capacity A2.4 Build advanced AI skills and knowledge, including AI ethics and governance, to develop a stable AI talent pipeline (future-proof the workforce)	A3.1 Strengthen cybersecurity policies, mechanisms, and toolkits to mitigate AI risks A3.2 Build capabilities in Privacy-Enhancing Technologies (PETs) and other novel technologies	A4.1 Strengthen the AI start-up ecosystem A4.2 Support and promote multi-stakeholder knowledge-sharing
PROMISING	P1.3 Empower the national AI body/agency to coordinate government efforts/initiatives on AI	P2.5 Accelerate AI adoption among businesses of all sizes (multinationals, MSMEs, and start-ups). P2.6 Strengthen data and digital literacy skills, with a focus on the usage, processing, and analysis of datasets in AI systems and platforms	P3.3 Strengthen data protection and cybersecurity for the enablement of responsible AI P3.4 Promote the adoption of risk mitigation tools P3.5 Establish a national regulatory AI testbed/sandbox for AI innovation	P4.3 Raise public awareness of AI risks and benefits for people, communities, and organizations
EMERGING	E1.4 Develop a national AI strategy E1.5 Name a national AI body/agency to coordinate the implementation of national AI initiatives	E2.7 Build foundational digital skills and knowledge, including fundamental data literacy and AI awareness/understanding	E3.6 Strengthen data protection and privacy enforcement, and build cybersecurity foundations E3.7 Build risk mitigation and monitoring mechanisms for AI	E4.4 Develop and maintain a regional repository of use cases on AI to better align/improve national approaches/initiatives on AI operationalization

Source: Access Partnership

TARGETED PILLAR 1: INTERNAL GOVERNANCE STRUCTURES AND MEASURES

'ADVANCED' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[92]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	A1.1 Review and Adapt AI governance frameworks to address evolving AI issues and developments			
Objective(s)	• **Address Evolving AI Issues and Developments:** By revising AI governance frameworks, governance mechanisms can remain robust and effective in addressing evolving AI issues and developments.			
A1.1.1 Review and adapt AI governance frameworks to address evolving AI issues and developments	• **Risk Identification and Assessment:** Conduct a landscape analysis to identify and analyze emerging risks and challenges associated with AI development and deployment. • **Foster Multi-stakeholder Engagement:** Facilitate collaborative engagement with diverse stakeholders, including government agencies, industry partners, academia, and civil society, to gather insights and perspectives on emerging risks and potential regulatory solutions. • **Update AI Governance Frameworks:** Update and strengthen AI Governance Frameworks governing AI technologies to address newly identified risks and ensure alignment with evolving ethical and legal standards. • **Implement Agile Governance Mechanisms:** Establish agile governance mechanisms capable of quickly adapting to changing circumstances and emerging risks in the AI ecosystem, ensuring timely	**Short-Term:** • Conduct a landscape analysis to identify and analyze emerging risks and challenges associated with AI development and deployment. • Organize meetings and workshops with diverse stakeholders, including government agencies, industry partners, academia, and civil society. • Gather insights and perspectives on emerging risks and potential regulatory solutions through initial stakeholder consultations. **Medium-Term:** • Compile a comprehensive inventory of potential risks, including technological, societal, and ethical considerations. • Develop risk assessment reports detailing the findings of the analysis and providing recommendations for risk mitigation strategies. **Long-Term:** • Revise and update AI governance frameworks based on the findings of risk assessments and stakeholder inputs. Incorporate new governance measures and guidelines to address newly identified risks and ensure alignment with evolving ethical and legal standards. • Establish mechanisms for real-time monitoring of AI developments and emerging risks, enabling prompt responses to evolving challenges.	General measures of progress include: • **Number of risks identified:** Track the number of new and emerging risks associated with AI development and deployment identified through landscape analysis. • **Stakeholder Engagement Volume and Diversity:** Monitor the quantity and diversity of feedback from stakeholders across different sectors (government, industry, academia, civil society) obtained during meetings, workshops, and dialogues. • **Launch of updated AI Governance Frameworks:** Launch and dissemination of the revised AI governance frameworks, accompanied by guidelines for implementation and adherence. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q8. Does the national AI policy contain measures that enable the development and deployment of responsible AI? • Q9. Does the national AI coordinating body have any mechanisms or measures related to responsible AI? • Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies/frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)?	To strengthen the AI governance framework in Canada, the government is taking a two-pronged approach in anticipation of new AI iterations and emerging risks. In 2022, the Canadian government tabled the Artificial Intelligence and Data Act (AIDA) which seeks to provide the legal basis for regulating AI technologies. The law is expected to pass in 2024. [93] Meanwhile, the government also sees an urgent need to establish guardrails for generative AI systems and tools. In this context, the government organized a consultation in August 2023 to seek feedback from the industry on the Voluntary Code of Conduct on the Responsible Development and Management of Advanced Generative AI Systems.[94] The Code of Conduct contains a range of measures

[92] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[93] Government of Canada (2023), Canadian Guardrails for Generative AI – Code of Practice,https://ised-isde.canada.ca/site/ised/en/consultation-development-canadian-code-practice-generative-artificial-intelligence-systems/canadian-guardrails-generative-ai-code-practice
[94] Government of Canada (2023), Canadian Guardrails for Generative AI – Code of Practice,https://ised-isde.canada.ca/site/ised/en/consultation-development-canadian-code-practice-generative-artificial-intelligence-systems/canadian-guardrails-generative-ai-code-practice

	responses to evolving challenges.	• Conduct regular reviews and assessments of agile governance mechanisms to evaluate their effectiveness and identify areas for improvement.		which firms can follow to address adverse impacts deriving from generative AI systems.[95] The voluntary document was published subsequently in September 2023.[96] The Canadian government states that it will prioritize generative AI governance regulation once AIDA is approved.[97]

[95] Government of Canada (2023), Voluntary Code of Conduct on the Responsible Development and Management of Advanced Generative AI Systems,https://ised-isde.canada.ca/site/ised/en/voluntary-code-conduct-responsible-development-and-management-advanced-generative-ai-systems
[96] *Ibid.*
[97] Government of Canada (2023), Canadian Guardrails for Generative AI – Code of Practice,https://ised-isde.canada.ca/site/ised/en/consultation-development-canadian-code-practice-generative-artificial-intelligence-systems/canadian-guardrails-generative-ai-code-practice

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[98]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A1.2 Develop Policy Guidelines to Promote Data Sharing Across Government Agencies**			
Objective(s)	• **Facilitate Interagency Collaboration:** Foster collaboration and coordination among government agencies to establish efficient mechanisms for data sharing while ensuring compliance with data privacy and security standards. • **Enhance Data Accessibility and Utilization:** Streamline data sharing processes and enhance accessibility to facilitate informed decision-making and innovation across government sectors, ultimately improving public service delivery and policy formulation. • **Promote Ethical Data Practices:** Develop policy guidelines/frameworks that emphasize ethical data handling practices, promoting transparency, accountability, and fairness in data sharing processes across government agencies.			
A1.2.1 Develop Policy Guidelines to Promote Data Sharing Across Government Agencies	• **Development of Policy Framework/Guidelines:** Develop a comprehensive policy guidelines/framework outlining protocols and standards for responsible data sharing among government agencies, ensuring alignment with overarching data governance principles and legal requirements. • **Capacity Development and Training Programs:** Implement capacity building programs and training sessions to equip government officials with the necessary knowledge and skills to effectively navigate responsible data sharing procedures, prioritize data privacy and security, and adhere to established policy guidelines.	**Short-Term:** • Initiate the drafting process for the comprehensive policy guidelines/framework outlining protocols and standards for responsible data sharing among government agencies. • Conduct a preliminary assessment of existing policies and legal requirements to inform the framework development. • Engage with relevant stakeholders, including government officials, legal experts, data privacy advocates, and industry representatives, to gather input and insights on policy framework requirements. • Organize workshops, focus group discussions, and consultations to solicit feedback and identify key priorities and concerns. **Medium-Term:** • Refine and finalize the policy framework based on stakeholder feedback, incorporating best practices, legal standards, and ethical considerations for responsible data sharing. • Conduct legal reviews and consultations to ensure compliance with data protection laws and regulations. • Design and develop training modules and materials tailored to the specific needs of government officials involved in data sharing activities.	General measures of progress include: • **Development of Data Sharing Policy Guidelines/Framework:** Launch of the data sharing policy guidelines/framework, which establishes clear protocols and standards for responsible AI data sharing between government agencies. • **Alignment with Data Governance Principles:** Track how well policy frameworks/guidelines align with existing data governance principles and legal requirements within your jurisdiction. This can involve conducting legal reviews and comparisons with national and international data governance frameworks. • **Number of Government Officials Trained in Responsible Data Sharing:** Track the number of government officials who participate in training programs focused on responsible data sharing. • **Data Sharing Efficiency:** Measure the timeliness and efficiency of data sharing processes between agencies facilitated by the new framework and protocols. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)?	Under the EU-Japan Economic Partnership Agreement, Japan and the European Union signed a protocol which include provisions on cross-border data flows. The protocol seeks to provide legal clarity, as well as assurance that both Japan and the European Union will not devise unjust data localization measures, and that both parties will respect rules on data protection and digital economy.[99] The protocol will come into effect once the European Parliament and Japan have rectified the provisions for approval.[100]

[98] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[99] European Council (2024), EU-Japan economic partnership agreement: EU and Japan sign protocol to include cross-border data flowswww.consilium.europa.eu/en/press/press-releases/2024/01/31/eu-japan-economic-partnership-agreement-eu-and-japan-sign-protocol-to-include-cross-border-data-flows/
[100] *Ibid.*

		• Collaborate with subject matter experts to cover topics such as data privacy principles, security protocols, risk management, and compliance requirements. **Long-Term:** • Launch the finalized policy framework and initiate the implementation phase, disseminating guidelines, protocols, and standards to relevant government agencies. • Monitor the adoption of policy guidelines and track compliance with data sharing procedures, providing support and guidance as needed to ensure effective implementation. • Conduct regular assessments, solicit feedback from stakeholders, and identify areas for improvement to refine the policy framework and training programs over time.		

'PROMISING' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[101]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**P1.3 Empower the National AI Body/Agency to Coordinate Government Efforts/Initiatives on AI**			
Objective(s)	• **Promote Consistent Approach to AI Governance:** Establish inter-governmental task forces to align policies and initiatives, ensuring a consistent approach to AI governance across government entities. • **Enhance Regulatory Efficiency:** Streamline bureaucratic processes by simplifying regulations and accelerating decision-making, creating a more agile environment conducive to AI innovation. • **Facilitate Effective Governance:** Enable institutions and administrations to navigate AI governance effectively, leveraging AI's transformative potential for societal and economic progress. • **Facilitate/Encourage the adoption/advancement of AI in the public sector**: Ensure AI is leveraged by public-sector organizations to improve the consistency and quality of public services, including through digital platforms and portals.			
P1.3.1 Empower the National AI Body/Agency to Coordinate Government Efforts/Initiatives on AI	• **Policy and Legislative Framework Establishment:** Obtain government approval and develop a legislative framework defining the mission, scope, and authority of the task force/agency. • **Leadership and Resource Management:** Appoint qualified leaders, allocate resources, and establish infrastructure to support the task force/agency's operations effectively. • **Policy Alignment and Coordination:** Facilitate alignment and coordination of AI-related policies, regulations, and initiatives across government agencies and ministries to ensure coherence and consistency in AI governance approaches. • **Capacity Building and Implementation Planning:** Build the capacity of staff and stakeholders through training	**Short-Term:** • Secure approval from relevant government authorities or agencies to establish the task force or agency. • Draft and finalize the legislative framework defining the mission, objectives, and scope of the task force or agency, ensuring alignment with government priorities and mandates. • Appoint qualified leaders to oversee the task force or agency, including a director or commissioner, to provide strategic direction and coordinate activities effectively. • Secure initial funding and resources to kickstart operations, including budgetary allocations and infrastructure setup. **Medium-Term:** • Engage with relevant stakeholders to gather input and collaboration, ensuring diverse perspectives are considered in the establishment and functioning of the task force or agency. • Develop and finalize policies, guidelines, and regulations related to AI governance, ethics, and development, laying the groundwork for responsible AI practices. • Conduct training, workshops, and educational programs to build the capacity of staff members and stakeholders, ensuring they have	General measures of progress include: • **Government Endorsement Secured:** Obtain approval from relevant government authorities or agencies to establish the inter-governmental AI task force or national AI agency, signifying initial endorsement and commitment towards advancing AI governance. • **Legislative Framework Defined:** Develop and finalize a legislative framework or mandate delineating the mission, objectives, and scope of the task force or agency, establishing the legal basis and operational guidelines. • **Stakeholder Engagement Initiated:** Commence engagement with relevant stakeholders, such as government agencies, industry representatives, academia, and civil society organizations, initiating collaborative efforts to address diverse perspectives and needs in AI governance. • **Capacity Building Initiatives Launched:** Roll out capacity building initiatives for staff members and stakeholders through training, workshops, and educational programs, ensuring personnel possess requisite skills and knowledge for effective role fulfillment. • **Implementation Planning Completed:** Develop a strategic plan and implementation roadmap delineating specific goals,	In March 2023, the United Kingdom government published a consultation on "AI regulation: a pro-innovation approach-policy proposal". The consultation sought views on implementing an AI policy framework, as well as a proposal for a new central function within the government to coordinate and oversee AI regulations and initiatives.[102] Based on the consultation outcome, the government announced the establishment of an Inter-Ministerial Group to drive AI coordination across the government.[103] Further, the Department of Science, Innovation and Technology (DSIT) was appointed as the chief government department that oversees AI policy, including regulation.[104] Therefore, the DSIT has assumed a role leading AI strategies and regulation in the government. For example, the DSIT released the "National AI Strategy-AI Action Plan" which outlines activities to

[101] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[102] GOV.UK (2023), AI regulation: a pro-innovation approach – policy proposals, www.gov.uk/government/consultations/ai-regulation-a-pro-innovation-approach-policy-proposals
[103] GOV.UK (2024), A pro-innovation approach to AI regulation: government response, www.gov.uk/government/consultations/ai-regulation-a-pro-innovation-approach-policy-proposals/outcome/a-pro-innovation-approach-to-ai-regulation-government-response
[104] *Ibid.*

	and workshops, while developing a strategic plan and implementation roadmap to guide the task force/agency's activities. • **Strategic Planning and Implementation:** Implement and execute national AI strategies, roadmaps, and action plans to guide national AI development, deployment, and regulation, addressing key areas such as research, innovation, ethics, and societal impact.	the necessary skills and knowledge to fulfill their roles effectively. **Long-Term:** • Develop a strategic plan and implementation roadmap outlining specific goals, objectives, and milestones for the task force or agency. Begin executing projects, conducting research, and collaborating with stakeholders to advance the mission and objectives. • Fully operationalize the task force or agency by setting up offices, establishing communication channels, and initiating activities outlined in the strategic plan. • Implement robust monitoring and evaluation mechanisms to assess the performance and impact of the task force or agency regularly. Adjust as needed to improve effectiveness and efficiency in achieving established goals and objectives.	objectives, and milestones for the task force or agency, providing a blueprint for action and guiding activities towards achieving established objectives. • **Monitoring and Evaluation Framework Established:** Establish a monitoring and evaluation framework to track performance and impact, measure progress against established goals, and facilitate adjustments as necessary, ensuring accountability and enabling continuous improvement in AI governance efforts. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q3. Is there a national AI body tasked with coordinating national AI priorities and goals? • Q4. Does the national AI agency/existing agency have a clear mandate, bureaucratic legitimacy, and allocated budget to do its job effectively? • Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies / frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)?	be undertaken by various government departments, including the Department for Business, Energy & Industrial Strategy, and the Department for Digital, Culture, Media and Sport.[105] Additionally, DSIT published a research report on "Evidence to Support the Analysis of Impacts for Artificial Intelligence" which analyzes the impact of different AI policy options which can be adopted by the United Kingdom government.[106]

[105] GOV.UK (2022) National AI Strategy - AI Action Plan, www.gov.uk/government/publications/national-ai-strategy-ai-action-plan
[106] GOV.UK (2023) Evidence to support the analysis of impacts for artificial intelligence governance, www.gov.uk/government/publications/evidence-to-support-the-analysis-of-impacts-for-artificial-intelligence-governance

'EMERGING' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[107]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	E1.4 Develop a National AI Strategy			
Objective(s)	• **Steering National AI Development:** Developing a national AI strategy with integrated responsible AI guidelines/principles provides a clear roadmap for steering national AI development in a responsible, ethical, and sustainable manner. • **Unlock Economic Opportunities:** A national AI strategy can position the country as a prominent technological player, fostering the attraction of talent and stimulating investment in AI research and development. These efforts can unlock economic opportunities and enhance the country's economic competitiveness.			
E1.4.1 Develop a National AI Strategy	• **Policy and Infrastructure Assessment:** Conduct a comprehensive evaluation of existing policies and infrastructure related to AI, analyzing strengths, weaknesses, and areas for improvement. This includes assessing legal frameworks, data governance practices, and technological infrastructure supporting AI development. • **National AI Strategy Development:** Formulate a comprehensive national AI strategy that aligns with broader technological and economic goals, encompassing key aspects such as research and development, workforce development, ethics, and governance. Ensure the strategy addresses the evolving needs of the country and reflects input from diverse stakeholders, including government agencies, industry leaders, academia, civil society, and the public. • **Integrate Responsible AI Guidelines/Principles into the National AI Strategy:** Establish a set of principles for the ethical design, development, and utilization of AI technologies, with a focus on fairness, accountability, transparency, and privacy considerations tailored to the country's specific needs and challenges. Draw	**Short-Term:** • Conduct a comprehensive assessment of existing policies and infrastructure related to AI. This includes identifying strengths, weaknesses, and key gaps in legal frameworks, data governance practices, and digital infrastructure supporting AI development. • Based on the assessment, develop actionable recommendations to address identified gaps and to inform the development of the national AI strategy. • Develop a draft AI strategy document outlining key goals, objectives, and focus areas. • Initiate consultations with diverse stakeholders, including government agencies, industry leaders, academia, civil society, and the public. Gather input, perspectives, and feedback to inform the development of the national AI strategy. **Medium-Term:** • Formulate a comprehensive national AI strategy that aligns with broader technological and economic goals. Address key aspects such as research and development, workforce development, ethics, and governance. Ensure the strategy reflects input from stakeholders and addresses the evolving needs of the country. • Develop a set of principles for the ethical design, development, and utilization of AI technologies. Focus on fairness,	General measures of progress include: • **Gap Analysis:** Identifying key gaps and challenges in the national AI landscape is critical for prioritizing areas for improvement and resource allocation. Understanding the barriers and limitations enables policymakers to develop targeted interventions and initiatives to address these challenges effectively. • **Completion of Draft National AI Strategy:** Track the development of the national AI strategy by assessing the completion of the draft document. Measure progress by evaluating the drafting process against predefined milestones and timelines. Completion of the draft strategy indicates significant advancement in the formulation stage and prepares for further refinement and finalization. • **Stakeholder Input Integration:** Monitor the incorporation of input from diverse stakeholders into the AI strategy. Track the integration of feedback obtained from government agencies, industry leaders, academia, civil society organizations, and the public during consultations and engagement sessions. Measure progress by assessing the extent to which stakeholder perspectives and recommendations are reflected in the strategy's objectives, priorities, and action plans.	In 2016, Japan launched the Artificial Intelligence Technology Strategy Council to develop a roadmap for the development and commercialization of AI.[108] This led to the release of the Artificial Intelligence Technology Strategy in 2017, which outlines priority areas for research and development focusing on certain thematic areas, and the need to collaborate between industry, government, and academia to advance AI research.[109] The process of crafting Japan's AI governance structure has always been done in collaboration with stakeholders according to an agile governance framework.[110] Japan's AI strategy undergoes constant review, with an updated version published in 2019, and the most recent one having been released in 2022.[111] Notably, in January 2024, the Ministry of Internal Affairs and Communications (MIC) and the Ministry of Economy, Trade, and Industry (METI) released draft AI Business Guidelines for public feedback. The draft

[107] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[108] Kantei (2016), Japan Revitalization Strategy 2016, www.kantei.go.jp/jp/singi/keizaisaisei/pdf/zentaihombun_160602_en.pdf
[109] Center for Data Innovation (2017), How Governments are Preparing for Artificial Intelligence, https://datainnovation.org/2017/08/how-governments-are-preparing-for-artificial-intelligence/
[110] Center for Strategic and International Studies (2023), Japan's Approach to AI Regulation and Its Impact on the 2023 G7 Presidency, www.csis.org/analysis/japans-approach-ai-regulation-and-its-impact-2023-g7-presidency
[111] *Ibid.*

	upon the seven guiding principles outlined in the ASEAN Guide on AI Governance and Ethics as a foundational reference. Integrate the responsible AI guidelines/principles into the national AI strategy. • **Diverse Stakeholder Engagement:** Engage a wide range of stakeholders in consultations and dialogues to gather input, perspectives, and feedback on the AI strategy. Facilitate discussions to build consensus among stakeholders on the key elements and priorities of the national AI strategy, fostering collaboration and ownership among all involved parties.	accountability, transparency, and privacy considerations tailored to the country's specific needs. Utilize the ASEAN Guide on AI Governance and Ethics as a reference. • Integrate the responsible AI guidelines/principles into the national AI strategy, ensuring coherence and alignment across all national AI initiatives. **Long-Term:** • Implement the national AI strategy, ensuring coordination across relevant government agencies and stakeholders. Establish mechanisms for monitoring progress and evaluating the impact of AI policies and initiatives. Adapt strategies as needed to address emerging challenges and opportunities. • Continuously review and update the national AI strategy to adapt to changing technological, economic, and social landscapes. • Continue to engage and collaborate with stakeholders in AI policy development processes.	• **Integration of Responsible AI Guidelines/Principles into National AI Strategy:** Measure progress toward integrating the responsible AI guidelines/principles into the national AI strategy. The finalization and integration of the responsible AI guidelines/principles marks a crucial milestone toward effectively shaping the country's approach to responsible AI governance and development. • **Finalization of National AI Strategy:** Measure the progress toward finalizing the national AI strategy by evaluating the completion of all necessary revisions, approvals, and formalizations. Assess the strategy's readiness for implementation by ensuring alignment with stakeholder feedback, government objectives, and broader national agendas. The finalization of the strategy marks a crucial milestone in the roadmap toward effectively shaping the country's approach to AI governance and development. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q1. Is there a national AI policy / strategy / law / regulation / framework in place? • Q2. Does the national AI policy have clear objectives, milestones, roadmap, roles & responsibilities so that it can be effectively implemented? • Q16. Does the public/private sector have any environment-related guidelines or mechanisms that guide AI's impact on the environment/climate change (either self-erected measures or imposed by the national government)? • Q17. Does the public/private sector have any policy guidelines or principles that outline the need for AI developments to protect/not harm human rights (either self-erected measures or imposed by the national government)? • Q18. Does the public/private sector have any guidelines or principles that outline the need for explainability and interpretability of AI systems (either	guidelines are aimed at providing AI developers, providers, and business users with unified guiding principles for AI governance to promote the safe and secure use of AI. The draft guidelines include prioritizing human-centered development and use of AI, protecting privacy and preventing misuse of personal data, and maintaining transparency and accountability.[112]

[112] DataGuidance (2024) Japan: MIC and METI request public comments on draft AI business guidelines, https://www.dataguidance.com/news/japan-mic-and-meti-request-public-comments-draft-ai

			self-erected measures or imposed by the national government)? • Q19. Does the public/private sector have any policy guidelines or principles that highlight the need for human oversight in AI deployment and development to ensure human control, decision making, and accountability in AI systems (either self-erected measures or imposed by the national government)? • Q20. Does the public/private sector have any policy guidelines or principles that govern the use of AI technologies in assisting human decision-making on issues directly affecting human life (e.g., autonomous weapons, self-driving cars, AI-assisted judicial decisions) (either self-erected measures or imposed by the national government)? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation? • Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies / frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)?	

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[113]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**E1.5 Name a National AI Body/Agency to Coordinate the Implementation of National AI Initiatives**			
Objective(s)	• **Enhanced Coordination and Efficiency:** Naming a national AI body/agency to coordinate the implementation of national AI initiatives ensures streamlined policy planning, effective resource allocation, and cohesive decision-making, thereby advancing national AI initiatives more efficiently.			
E1.5.1 Name a National AI Body/Agency to Coordinate the Implementation of National AI Initiatives	• **Name or designate a national AI body/agency:** Name a dedicated AI body/agency for overseeing and coordinating the implementation of the national AI strategy. This AI agency/body acts as the main point of contact for all AI-related initiatives and stakeholders, facilitating communication, collaboration, and alignment of efforts. • **Development of Inter-agency Collaboration Mechanisms:** Create systems for collaboration and coordination among government agencies, departments, and ministries involved in AI-related activities. This may include regular meetings, working groups, and task forces focused on specific aspects of AI strategy implementation, ensuring cohesive and synchronized efforts across the government. Develop clear roles, responsibilities, and scope for the involved ministries. • **Engagement with External Stakeholders:** Foster partnerships and collaboration with external stakeholders, such as industry players, academic institutions, civil society organizations, and international partners. Involving a diverse range of stakeholders, including those outside of government, in the coordination process ensures that the implementation of the national AI strategy benefits from additional expertise, resources, and perspectives.	**Short-Term:** • Formally name a national AI body/agency responsible for overseeing and coordinating the implementation of the national AI strategy. • Establish initial systems for collaboration and coordination among government agencies, departments, and ministries involved in AI-related activities, including the organization of initial meetings and working groups. • Begin the process of assessing resource needs and allocating initial funding and support to key activities and initiatives outlined in the national AI strategy. **Medium-Term:** • Enhance the capabilities and effectiveness of the dedicated agency/office/task force responsible for AI coordination, including refining communication channels and coordination processes. • Formalize and institutionalize systems for collaboration and coordination among government agencies, departments, and ministries involved in AI-related activities, ensuring sustained and synchronized efforts. • Expand and deepen partnerships and collaboration with external stakeholders, fostering deeper relationships and leveraging additional expertise, resources, and perspectives. • Review and optimize resource allocation processes, ensuring that resources are effectively utilized and aligned with evolving priorities and needs identified in the national AI strategy. **Long-Term:** • Consolidate and strengthen the central AI coordination mechanisms, ensuring their sustainability and effectiveness over the long term.	General measures of progress include: • **Appointment of National AI Body/Agency:** Measure progress by assessing the appointment of a national AI body/agency responsible for coordinating national AI initiatives. • **Operational Framework:** Evaluate the development and approval of operational frameworks, including mandates, responsibilities, and reporting structures, for the centralized AI coordination agency/office/task force. • **Establishment of Working Groups:** Monitor the creation of interagency working groups or committees focused on specific aspects of AI strategy implementation, such as research and development, ethics, or regulatory frameworks. • **Stakeholder Participation:** Measure the level of participation and engagement of external stakeholders in AI coordination activities, such as working groups, consultations, and policy discussions. • **Budget Allocation:** Monitor the allocation of budgetary resources to fund AI-related activities and initiatives outlined in the national AI strategy. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q3. Is there a national AI body tasked with coordinating national AI priorities and goals? • Q4. Does the national AI agency/existing agency have a clear mandate, bureaucratic legitimacy, and allocated budget to do its job effectively? • Q5. Does the national AI agency/existing agency engage with AI industry players to spread awareness of planned or existing national AI measures (policies, strategies, laws, regulations, etc.)?	In the Philippines, the Department of Trade and Industry has taken the lead in formulating the country's National AI Strategy Roadmap.[114] The document has been crafted in close collaboration with members of an interagency task force composed of other government ministries, such as the Departments of Agriculture, Science and Technology, ICT, Education, the Commission on Higher Education, and the National Economic and Development Authority, with each agency having specific roles to play in the plan's operationalization. Considering the multi-faceted nature of AI, the development and implementation of the Roadmap has been supported by stakeholders like the Asian Institute of Management, the USAID, various state universities, research institutions, and members of industry.[115]

[113] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[114] Philippine News Agency (2019), Gov't crafting AI road map to improve PH productivity, www.pna.gov.ph/articles/1075265
[115] OpenGov (2019), The Philippines to draft an Artificial Intelligence roadmap, https://opengovasia.com/2019/08/01/the-philippines-to-draft-an-artificial-intelligence-roadmap/

	Resource Allocation and Management: Ensure that strategies and implementation functions outlined in the national AI strategy are adequately funded and supported. This involves allocating resources, including financial, human, and technological resources, to key activities and initiatives identified in the strategy. Additionally, establish mechanisms for monitoring and managing resource utilization to ensure efficient and effective implementation of the strategy.	• Establish sustainable partnerships with external stakeholders, fostering long-term collaboration and engagement to support ongoing AI strategy implementation. • Establish mechanisms for sustainable resource allocation and management, ensuring ongoing funding and support for AI initiatives and activities outlined in the national AI strategy.		

TARGETED PILLAR 2: SKILLS & KNOWLEDGE FOR RESPONSIBLE, AI-AUGMENTED DECISION-MAKING

'ADVANCED' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[116]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A2.1 Develop Targeted Provisions/Regulations for Invisible/At-Risk Populations**			
Objective(s)	• **Promote Inclusive AI Adoption:** Develop tailored provisions/regulations to address the specific needs and vulnerabilities of invisible/at-risk communities, fostering inclusive AI adoption and mitigating the risks of exclusion and inequity in AI technologies' deployment and impact. • **Ensure Ethical and Fair Treatment:** Develop targeted provisions/regulations for invisible/at-risk populations to ensure that AI systems are ethically designed and deployed, protecting vulnerable groups from potential harm, discrimination, or biases.			
A2.1.1 Develop Targeted Provisions/Regulations for Vulnerable Populations	• **Engagement with Invisible/At-Risk Communities:** Engage closely with pertinent stakeholders, including advocacy groups and community representatives, to comprehensively grasp the distinct AI-related risks and challenges, particularly concerning data rights and privacy, encountered by invisible/at-risk populations such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled. • **Development of Tailored Legal Safeguards:** Develop and integrate specialized provisions and/or regulations specifically designed to protect the data privacy and rights of invisible/at-risk populations, addressing their unique vulnerabilities, risks, and challenges.	**Short-Term:** • Identify and establish contact with relevant advocacy groups, community representatives, and stakeholders representing invisible/at-risk populations. • Conduct initial discussions and needs assessments with stakeholders to understand the distinct AI-related risks and challenges, particularly concerning data rights and privacy. • Conduct research and analysis to identify existing legal frameworks and gaps related to the protection of data and privacy rights for vulnerable populations in other jurisdictions or domains. • Begin drafting initial provisions or regulations tailored to address the identified challenges and needs of invisible/at-risk populations. **Medium-Term:** • Conduct in-depth consultations and engagements with stakeholders to gather feedback on the draft provisions/regulations and refine them based on stakeholder input. • Implement pilot programs or case studies to test the effectiveness and feasibility of the proposed provisions/regulations in addressing data and privacy challenges for invisible/at-risk populations. • Subject the draft provisions/regulations to legal review and revision to ensure compliance with existing laws and regulations while adequately	General measures of progress include: • **Number of stakeholder groups engaged:** Track the number and diversity of advocacy groups, invisible/at-risk community representatives, and other stakeholders involved in the engagement process. • **Participation rates:** Monitor the level of participation in public consultations to gauge the extent of public interest and engagement with the drafted provisions/regulations. • **Implementation progress:** Track the progress of formal implementation of the finalized provisions/regulations, including enactment into law or adoption by relevant authorities. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q28. Does the public/private sector have any data governance and data sovereignty mechanisms or guidelines that include invisible/at-risk populations such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-erected measures or imposed by the national government)? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing,	In Scotland's AI Strategy, the Scottish Government committed to the development of "trustworthy, ethical and inclusive AI" which protect children's rights. To ensure children's rights are protected in the development of AI, the Scottish government commissioned the Children's Parliament, the Scottish AI Alliance and the Alan Turing Institute to support the "Exploring Children's Rights and AI project".[117] The project leverages workshops and small focus groups with children to gain insights into how AI impacts children's human rights. [118] The project is expected to provide guidance to policymakers to policy areas of concerns, and offer a framework to include children in future AI policy designs.[119]

[116] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[117] Children in Scotland (2024), Safer Internet Day 2024: Exploring children's rights and AI, https://childreninscotland.org.uk/safer-internet-day-2024-exploring-childrens-rights-and-ai
[118] *Ibid.*
[119] Children's Parliament (2023), Exploring Children's Rights and AI, www.turing.ac.uk/sites/default/files/2023-05/exploring_childrens_rights_and_ai.pdf

		addressing the needs of invisible/at-risk populations. ● Open the draft provisions/regulations for public consultation to gather broader input from the public, including stakeholders and experts outside the immediate community. **Long-Term:** ● Finalize the provisions/regulations after incorporating feedback from stakeholders and legal review, and proceed with the formal implementation process. ● Develop and implement training and awareness programs to educate relevant stakeholders, including government officials, data handlers, and the general public, about the rights and protections afforded to vulnerable populations under the new provisions/regulations. ● Establish mechanisms for ongoing monitoring and evaluation to assess the effectiveness of the provisions/regulations in protecting the data and privacy rights of invisible/at-risk populations. ● Continuously review and update the provisions/regulations based on feedback, emerging challenges, and changes in technology and societal needs to ensure their continued relevance and effectiveness.	research and development, development of AI ethics and principles, and innovation? ● Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies / frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)? ● Q39. Does the public/private sector have any non-discrimination and fairness mechanisms or guidelines that outline the need for diverse and representative data collection—including data from invisible/at-risk populations such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-erected measures or imposed by the national government)?	

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[120]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A2.2 Promote Digital Inclusion and Accessibility in AI System Design**			
Objective(s)	• **Promoting Equity and Inclusion:** Prioritizing accessibility for marginalized populations such as the elderly, disabled, and people with low digital literacy ensures that AI technologies and opportunities are accessible to all members of society. This reduces barriers to participation and ensures that marginalized groups are not left behind in the rapidly advancing digital landscape. • **Enhancing AI Adoption and Impact:** Prioritizing accessibility for diverse groups, including marginalized populations, broadens the user base and maximizes AI's societal impact. This fosters a wider range of user feedback and fuels innovation, leading to the development of more inclusive and effective AI solutions that benefit everyone.			
A2.2.1 Inclusive Training and Awareness Initiatives	**Accessible Training Programs:** Form partnerships with community centers, senior activity centers, and civil society organizations to co-design and implement accessible training programs specifically tailored to the needs of diverse groups in navigating AI applications. Offer multi-sensory learning materials and provide sign language interpretation during training sessions to ensure inclusivity and accessibility for all participants.	**Short-Term:** • Identify potential partner organizations, including community centers, senior activity centers, and civil society organizations. • Initiate discussions and meetings with potential partners to establish collaboration agreements and outline roles and responsibilities. • Conduct thorough needs assessments within target communities to understand the specific challenges and needs in navigating AI applications. • Co-design training program structures and materials, incorporating multi-sensory learning techniques and accessibility features such as sign language interpretation. • Secure funding and resources necessary for the implementation of the training programs, including funding for materials, interpreters, and venue rental if applicable. • Prepare training materials, including developing accessible guides, presentations, and interactive activities tailored to diverse learning styles and abilities. **Medium-Term:** • Roll out the accessible training programs in collaboration with partner organizations, ensuring that sessions are inclusive and accessible to all participants. • Conduct training sessions on a regular schedule, covering fundamental concepts of AI and practical applications, while providing individualized support as needed. • Monitor the delivery of training sessions and gather feedback from participants to assess the	General measures of progress include: • **Diversity of Participants:** Monitor the demographics of participants to ensure the programs reach a diverse range of individuals within the community (age, disability, socioeconomic background, etc.). • **Number of Partnerships with Community Organizations:** Track the number of partnerships established with various community centers, senior activity centers, and civil society organizations to offer the training programs. • **Pre- and Post-Training Assessments:** Conduct assessments before and after the training programs to measure participants' knowledge and confidence in using AI applications. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q31. Do NGOs, CSOs, and other citizen organizations provide skilling, reskilling, or upskilling training opportunities for employees in AI-related skills, and specifically in responsible AI implementation/deployment? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	The Center for Learning Sciences (LEARN) is a translational research organization under the Swiss Federal Institute of Technology Lausanne (EPFL). In 2023, LEARN collaborated with elderly center *Toujours Plus* to tailor two workshops on AI education for senior citizens.[121] The workshop involves training in basic AI concepts, machine learning, and practical exercises with AI tools.[122]

[120] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[121] LEARN (2023), AI for senior citizens: Center LEARN launches new workshop, https://learn.epfl.ch/news_learn/ai-for-senior-citizens-center-learn-launches-new-workshop
[122] *Ibid.*

		effectiveness of the programs in meeting their needs. • Evaluate participant progress and comprehension of AI concepts through pre- and post-training assessments, adjusting program content and delivery methods accordingly. • Provide capacity-building opportunities for partner organizations to ensure their ability to sustain the training programs beyond the initial implementation phase. • Explore opportunities for expanding the reach of the training programs to additional communities or scaling up existing programs based on demand and resources available. **Long-Term:** • Use feedback and insights gathered from evaluations to continuously improve program content, delivery methods, and accessibility features. • Engage with local communities and stakeholders to advocate for the importance of digital literacy and AI understanding, promoting the benefits of continued participation in the training programs. • Collaborate with policymakers and other key stakeholders to advocate for increased support and funding for accessible training initiatives, highlighting their role in promoting digital inclusion and equity.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[123]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A2.3 Enhance Public Sector AI Capacity**			
Objective(s)	• **Effective Governance and Service Delivery:** Building public sector AI capacity enhances governance and service delivery by enabling more efficient decision-making and resource allocation, resulting in better public services for citizens. • **Innovation and Problem-Solving:** Investing in public sector AI capacity fosters innovation and problem-solving within government institutions, leading to the development of creative solutions for complex societal challenges. • **Enhanced Data Analytics and Decision-Making:** Strengthening public sector AI capacity enables governments to analyze data more effectively, gaining valuable insights to inform data-driven decisions that drive positive societal outcomes.			
A2.3.1 Establish Responsible AI Training Programs for Public Sector Officers	• **Training and Skill Development Programs:** Implement comprehensive training and skill development programs to enhance the AI literacy and capabilities of public sector employees, including workshops, seminars, and online courses tailored to different levels of expertise. Ensure these programs focus on implementation of responsible AI practices in AI deployment within government operations.	**Short-Term:** • Conduct a thorough assessment to identify the specific AI training needs of public sector officers, considering their roles, responsibilities, and levels of AI proficiency. • Develop a comprehensive curriculum for responsible AI training programs, outlining key concepts, case studies, and practical exercises to enhance officers' understanding and application of ethical AI principles. • Design the structure and format of the training programs, incorporating a blend of online modules, workshops, seminars, and hands-on exercises to cater to different learning preferences and schedules. • Engage relevant stakeholders, including government agencies, AI experts, academia, and industry partners, to gather insights and feedback for refining the training program content and delivery approach. **Medium-Term:** • Roll out pilot sessions of the responsible AI training programs to a select group of public sector officers, gathering feedback and evaluating the effectiveness of the training materials and methodologies. • Refine and iterate on the training curriculum, materials, and delivery methods based on the feedback received from pilot sessions to address any identified gaps or areas for improvement. • Scale up the delivery of responsible AI training programs to reach a wider audience of public sector officers across different government agencies, ensuring equitable access to training opportunities. • Establish mechanisms for monitoring the uptake and impact of the training programs, collecting data on participant satisfaction, knowledge retention, and	General measures of progress include: • **Number of Public Sector Employees Trained:** Measure the percentage of public sector officers who enroll in and complete the responsible AI training programs. • **Knowledge Assessment Scores:** Evaluate the proficiency of participants in understanding ethical considerations, transparency, accountability, and fairness in AI deployment through pre- and post-training assessments. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q22. Does the government develop, deploy, and adopt AI solutions to enhance the delivery of public services?	The United Kingdom Central Digital Data Office (CDDO), in partnership with the Government Skills and Curriculum Unit and the industry, launched a series of online courses on generative AI. The courses are designed for civil servants to learn about a range of topics, including risks, ethics, tools, and applications of generative AI.[124] Apart from online courses, the CDDO is also working on developing a Prospectus to provide guidance to civil servants on other learning areas specific to generative AI and AI.[125]

[123] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[124] Central Digital and Data Office (2024),Artificial Intelligence: introducing our series of online courses on generative AI,https://cddo.blog.gov.uk/2024/01/19/artificial-intelligence-introducing-our-series-of-online-courses-on-generative-ai
[125] *Ibid.*

		behavioral changes related to responsible AI practices. **Long-Term:** • Embed responsible AI principles into the organizational culture of public sector agencies, fostering a culture of continuous learning and ethical decision-making in AI-driven initiatives and projects. • Continuously review and update the responsible AI training programs to keep pace with evolving technological advancements, regulatory requirements, and ethical considerations in the field of AI. • Facilitate knowledge sharing and collaboration between public sector agencies, academia, research institutions, and industry partners to exchange best practices, lessons learned, and emerging trends in responsible AI implementation. • Ensure the sustainability and long-term commitment to responsible AI training initiatives by securing adequate funding, resources, and leadership support to sustain ongoing training efforts and promote a culture of responsible AI governance within the public sector.		
A2.3.2 Invest in AI Equipment and Tools for Public Sector Agencies	• **Invest in AI Infrastructure and Tools for Public Sector Agencies:** Allocate resources to invest in AI infrastructure, such as cloud computing services and AI-enabled software tools, to empower public sector agencies with the necessary technological capabilities for AI implementation. This includes providing access to high-quality datasets, AI development platforms, and computational resources to facilitate AI-driven innovations in government services and operations.	**Short-Term:** • Conduct a comprehensive assessment of the existing IT infrastructure and technological capabilities within public sector agencies to identify gaps and requirements for AI implementation. • Collaborate with relevant stakeholders to identify specific AI applications and use cases that can enhance government services and operations. • Research, evaluate, and select suitable vendors and service providers for cloud computing services, AI tools, and platforms based on the identified needs and budget constraints. • Initiate the procurement process to acquire necessary AI infrastructure components, including cloud computing resources, software licenses, and hardware upgrades. • Provide training and capacity-building sessions for IT personnel and relevant staff members to familiarize them with AI concepts, tools, and platforms. **Medium-Term:** • Implement the acquired AI infrastructure components and tools within public sector agencies, ensuring seamless integration with existing systems and processes.	General measures of progress include: • **Usage and Adoption Rate:** Track the usage and adoption rate of AI tools and infrastructure by public sector agencies for various purposes such as decision-making, service delivery, and operational efficiency improvements. • **Quality of AI-enabled Solutions:** Assess the quality and effectiveness of AI-enabled solutions deployed in public sector agencies by evaluating factors such as accuracy, reliability, and user satisfaction. • **Feedback from Public Sector Agencies:** Gather feedback from public sector agencies regarding the usability, effectiveness, and impact of AI infrastructure and tools in their day-to-day operations. • **Cost Savings and Efficiency Gains:** Measure the cost savings and efficiency gains achieved by public sector agencies through the implementation of AI infrastructure and tools, including reductions in manual effort, processing time, and resource utilization.	The Australian Government published the Digital and Data Government Strategy which outlines the use of data and digital technologies to assist in a range of areas, including enhancing service delivery and advancing interoperability.[126] Against this strategy, the Australian Public Service (APS) commenced a 6-month trial of Copilot for Microsoft 365 in March 2024. The trial enlisted more than 7,400 public servants to explore how generative AI can assist in enhancing public service delivery.[127] As part of the trial, participating staff is required to undergo a learning modules and tests customized in accordance to the Interim Guidance for Agency Use of Generative AI. The Guidance include five core principles on accountability, transparency and explainability, privacy protection and security, fairness and human-centered values, and human, societal and environmental well-being.[128]

[126] Australian Government Digital Transformation Agency (2024), APS trials generative AI to explore safe and responsible use cases for government. www.dta.gov.au/blogs/aps-trials-generative-ai-explore-safe-and-responsible-use-cases-government
[127] *Ibid.*
[128] Australian Government Digital Transformation Agency (2024), APS trials generative AI to explore safe and responsible use cases for government. www.dta.gov.au/blogs/aps-trials-generative-ai-explore-safe-and-responsible-use-cases-government

		• Undertake data preparation and integration efforts to ensure the availability of high-quality datasets for AI training and deployment purposes. • Initiate pilot AI projects across different government departments to demonstrate the feasibility and benefits of AI-driven solutions in improving service delivery and operational efficiency. • Establish mechanisms for monitoring the performance and effectiveness of the deployed AI infrastructure and tools, collecting feedback from end-users and stakeholders for continuous improvement. • Conduct periodic reviews and optimization exercises to fine-tune the AI infrastructure and tools based on lessons learned from pilot projects and user feedback. **Long-Term:** • Scale up successful AI projects and initiatives to other departments and agencies, leveraging the established infrastructure and best practices. • Foster collaboration with research institutions, academia, and industry partners to explore cutting-edge AI technologies and innovations that can further enhance public sector services and operations. • Implement a culture of continuous improvement and innovation, regularly upgrading and expanding the AI infrastructure and tools to keep pace with technological advancements and evolving user needs. • Share insights, best practices, and lessons learned from AI implementation projects with other government agencies and stakeholders, while also investing in ongoing capacity development initiatives to build AI expertise within the public sector workforce.	Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q21. Do the public and private sectors have the infrastructure to develop, deploy, and adopt AI solutions?	

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[129]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A2.4 Build advanced AI skills and knowledge, including AI ethics and governance, to develop a stable AI talent pipeline (future-proof the workforce)**			
Objective(s)	• **Drive Innovation and Economic Growth:** Cultivating an AI talent pipeline drives innovation and economic growth by supplying a skilled workforce capable of developing and implementing AI solutions to address emerging challenges. • **Promote Ethical AI Development and Deployment:** Ensuring a responsible AI talent pipeline equips professionals with the necessary knowledge and skills to develop and deploy AI technologies ethically, safeguarding against potential risks and promoting trust in AI systems. • **Sustain Global Competitiveness:** A robust AI talent pipeline sustains global competitiveness by attracting top talent, fostering collaboration and knowledge sharing, and positioning the country as a leader in AI research, development, and deployment. • **Minimize Job Displacement:** Implement enhanced lifelong learning initiatives and support workforce transition to equip individuals with the adaptability needed to meet evolving job requirements, reducing vulnerability to unemployment amidst AI advancements and technological shifts. • **Sustainable Economic Growth:** Facilitate workforce transition and job redesign strategies to effectively harness human capital in AI-driven sectors, boosting productivity and innovation and contributing to sustained economic growth and global competitiveness.			
A2.4.1 Nurture Early AI Exposure and Interest	• **Curriculum Integration:** Collaborate with educational institutions to integrate AI-related topics and projects into the curriculum at various levels of education, from primary to secondary schools. • **Extracurricular Activities:** Develop and support extracurricular programs, coding bootcamps, and AI-focused hackathons to spark early engagement with AI and computational thinking skills.	**Short-Term:** • Conduct meetings with educational stakeholders to discuss the integration of AI topics into existing curriculum frameworks. • Develop pilot AI-related modules or lessons for select primary and secondary schools. • Organize workshops or training sessions for teachers to familiarize them with AI concepts and teaching methodologies. **Medium-Term:** • Implement AI-related curriculum enhancements across a wider range of schools, reaching a significant portion of students. • Expand extracurricular programs and activities to involve more students, schools, and community organizations. • Evaluate the effectiveness of the integrated curriculum and extracurricular activities through surveys, assessments, and feedback from students and educators. **Long-Term:** • Fully integrate AI-related topics and projects into the national education curriculum for all levels, ensuring comprehensive coverage and alignment with industry needs. • Establish AI-focused programs or specialized schools to provide advanced learning opportunities for students interested in pursuing AI-related fields. • Sustain and expand extracurricular AI initiatives to nurture a continuous pipeline of talent and foster a culture of innovation and AI literacy in schools and communities.	General measures of progress include: • **Curriculum Integration:** Number of educational institutions that have integrated AI-related topics into their curriculum at different levels. • **Extracurricular Activities:** Number of extracurricular AI programs, coding bootcamps, and hackathons organized. • **Participation rate:** Student enrolment and participation rates in AI-related courses or programs.	To develop the human capital necessary for AI development, the Luxembourg government envisioned the integration of AI-related skills and courses at different education levels. At the primary and secondary school level, the students are expected to learn about computational thinking and coding through initiatives such as Kids Life Skills. Students can also undertake AI-courses through the Luxembourg Tech School.[130] In the long term, the government will map the existing AI education initiatives against skills required in the privacy sector and integrate the findings to the country's human capital policies, such as the Digital Skills Bridge.[131]

[129] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[130] AI Watch (2021), Luxembourg AI Strategy Report, https://ai-watch.ec.europa.eu/countries/luxembourg/luxembourg-ai-strategy-report_en#human-capital
[131] *Ibid.*

A2.4.2 Build a Robust Higher Education Ecosystem for AI	• **Establish AI Degree Programs:** Partner with universities and academic institutions to jointly develop AI undergraduate, graduate, and postgraduate programs that center around responsible AI. These programs should feature key responsible AI principles/frameworks. • **Research and Innovation Centers for Responsible AI:** Allocate funding and resources to advance groundbreaking research projects at AI centers of excellence and research institutes. Implement incentives for faculty and students to drive exploration and innovation in the field of responsible AI.	**Short-Term:** ***Curriculum Development for Responsible AI*** • Partner with universities and academic institutions to develop AI degree programs on responsible AI. • Integrate AI courses covering responsible AI principles/frameworks into existing academic programs. • Conduct faculty training workshops to ensure instructors are equipped to teach responsible AI principles effectively. ***Research and Innovation Centers for Responsible AI*** • Allocate funding and resources to establish research and innovation centers focused on responsible AI practices. • Encourage faculty and students to pursue research projects that address ethical considerations, social implications, and the impact of AI technologies on society through providing research grants and opportunities. **Medium-Term:** ***Curriculum Development for Responsible AI*** • Roll out the AI degree programs and specialized professional development courses focusing on responsible AI for university students and working professionals respectively. • Evaluate the effectiveness of the curriculum/specialized professional development courses in instilling ethical awareness and responsible AI practices among students/working professionals through regular assessments and feedback mechanisms. • Establish partnerships with industry stakeholders to incorporate real-world case studies and practical applications of responsible AI into professional development programs. ***Research and Innovation Centers for Responsible AI*** • Expand the scope and capacity of research and innovation centers dedicated to responsible AI, attracting top talent and fostering a vibrant research community. • Support interdisciplinary research projects that explore the societal impacts of AI technologies, develop ethical frameworks for AI deployment, and promote transparency and fairness in AI systems. • Disseminate research findings through publications, conferences, and public forums to contribute to the global discourse on responsible AI governance and policy. **Long-Term:** ***Curriculum Development for Responsible AI***	General measures of progress include: • **Number of AI-related Degree Courses and Professional Development Programs:** Measure the quantity and diversity of AI degree courses and specialized professional development programs developed for students and working professionals respectively. • **Student Enrolment:** Track the enrolment rates in AI courses and degree programs to assess the level of interest and uptake among students. • **Research Output:** Monitor the quantity and quality of research publications, patents, and innovations produced by AI research centers to gauge their contributions to the field. • **Funding Utilization:** Assess the utilization of funding allocated to AI research centers, including the efficiency of resource allocation and the impact of investments on research outcomes. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q25. Do universities offer undergraduate/graduate/postgraduate courses on AI, and specifically, on a responsible approach to AI?	As part of the UK's National AI Strategy, the government has invested in a portfolio of education initiatives, including a partnership with The Alan Turing Institute to support Turing AI Fellowships. The Fellowship seeks to advance the UK's AI research and innovation, and embed "safe, ethical and responsible AI technologies at all stages of research".[132] Through the Technology Missions Fund, the United Kingdom government allocated GBP 31 million (USD 39 million) across four areas, which include an investment in responsible and trustworthy AI.[133] The funding led to the establishment of *Responsible AI UK*; a research program led by various academic institutions in the United Kingdom to further work on responsible AI.[134] Another notable example is the Mozilla Foundation's Responsible Computing Challenge which supports the conceptualization, development, and piloting of curricula that empowers students to think about the social and political context of computing. Between 2018 and 2021, Mozilla Foundation awarded USD3.5 million in prizes to curricula embedding ethics into undergraduate computer science education in the United States. Starting in 2022, the Challenge expanded globally to universities in Kenya and India, awarding up to USD1.2 million to institutions. This expansion reflects the global nature of computing and the ethical dilemmas and geographic inequities that often result from a narrow focus on technology in the United States and Europe.[135]

[132] GOV.UK (2024), Turing Artificial Intelligence Fellowships, www.gov.uk/government/publications/turing-artificial-intelligence-fellowships/turing-artificial-intelligence-fellowships
[133] UK Research and Innovation (2023), £250m to secure the UK's world-leading position in technologies of tomorrow, www.ukri.org/news/250m-to-secure-the-uks-world-leading-position-in-technologies-of-tomorrow
[134] Responsible AI UK (2023) Our mission, www.rai.ac.uk
[135] Mozilla Foundation (2024) Responsible Computing Challenge, Mozilla Foundation - Responsible Computing Challenge

		• Institutionalize responsible AI education as a core component of higher education curricula, ensuring that future generations of professionals are well-equipped to navigate ethical challenges in AI development and deployment. • Establish accreditation standards and certification programs for responsible AI development programs to promote quality assurance and accountability across academic institutions. • Continuously update and evolve the curriculum in response to emerging ethical dilemmas, technological advancements, and evolving regulatory frameworks in the field of AI. ***Research and Innovation Centers for Responsible AI*** • Attract international collaborations and investments in responsible AI research initiatives. • Influence policy development and industry practices by providing evidence-based recommendations and thought leadership on responsible AI governance and regulation.		
A2.4.3 Foster Industry Collaboration and Experiential Learning	• **Industry Partnerships and Internship Programs:** Forge partnerships with industry leaders to offer internship programs, co-op opportunities, and industry-sponsored projects for students to gain practical experience in AI development and deployment. • **Knowledge Sharing with Industry Partners:** Facilitate knowledge exchange and collaboration between academia and industry through joint research projects, guest lectures, and industry mentorship programs.	**Short-Term:** • Launch initial discussions and negotiations with industry leaders to establish partnerships for internship programs and industry-sponsored projects. • Identify key areas of collaboration and knowledge exchange between academia and industry through preliminary meetings and workshops. **Medium-Term:** • Formalize partnerships with industry stakeholders, outlining internship program structures, project requirements, and mutual expectations. • Initiate knowledge-sharing initiatives such as joint research projects, guest lectures, and mentorship programs with industry partners. • Begin implementing internship programs and co-op opportunities, providing students with hands-on experience in AI development and deployment. **Long-Term:** • Expand and deepen industry partnerships to include a wider range of companies and sectors, diversifying internship opportunities and research collaborations. • Evaluate the effectiveness of internship programs and knowledge-sharing initiatives, making necessary adjustments based on feedback from students and industry partners.	General measures of progress include: • **Number of industry-academia Partnerships:** Monitor the number of industry partnerships established with academic institutions for internship programs and industry-sponsored projects. • **Internship Participation Rate:** Track the participation rate of students in AI-related internship programs and co-op opportunities. • **Percentage of Graduates entering AI-related sectors/industries:** Measure the percentage of graduates securing employment in AI-relevant sectors/industries post-internship or co-op programs. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q24. Is there sufficient AI talent to meet the manpower demands in the private sector?	The United Kingdom government initiated an industry-funded Masters in AI(IMAI) program from 2016-2019 to increase AI talents at the postgraduate level. The program was funded by 19 industry partners with 17 participating higher education institutions.[136] The program also implemented work placements/ internships for students to work for funding internship partners.[137] To advance higher education and AI research, the United States administers several fellowship programs including the Stanford University Human-centered Artificial Intelligence (HAI) Fellowship Program,[138] the Eric and Wendy Schmidt AI in Science Postdoctoral Fellowship,[139] Census Bureau Emerging Technology Fellowship Program,[140] and the American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellowship.[141]

[136] Ecorys (2022) Evaluation of the Industrial Masters in AI (IMAI) program, https://assets.publishing.service.gov.uk/media/639c830ad3bf7f37573a1c1d/IMAI_Evaluation_Report_ACCESSIBLE.pdf
[137] *Ibid.*
[138] HAI (2024) Fellowship Programs, Fellowship Programs | Stanford HAI
[139] Schmidt Futures (2024) The Eric and Wendy Schmidt AI in Science Postdoctoral Fellowship, Schmidt AI in Science Postdocs - Schmidt Futures
[140] US Census Bureau (2024) Emerging Technology Fellowship Program, Emerging Technology Fellowship Program (census.gov)
[141] AAAS (2024) AAAS Seeks Applications for the STPF Rapid Response Cohort in AI, AAAS Seeks Applications for the STPF Rapid Response Cohort in AI | American Association for the Advancement of Science (AAAS)

		Establish long-term sustainable models for industry-academia collaboration in AI, ensuring ongoing knowledge exchange and mutually beneficial partnerships.		
A2.4.4 Attract and Retain Global AI Talent	• **Visa and Immigration Policies:** Review and streamline visa and immigration policies to make it easier for international AI experts to relocate and work in the country. • **Collaboration with Academic Institutions:** Forge partnerships with leading international academic institutions to attract AI researchers and scholars through exchange programs, joint research projects, and faculty positions. • **Industry Collaboration:** Collaborate with industry leaders to create attractive career opportunities and incentives for global AI talent, including competitive salaries, benefits, and opportunities for career advancement. • **Networking Events and Conferences:** Organize networking events, conferences, and workshops to connect with global AI talent, showcase opportunities in the local ecosystem, and foster collaboration and knowledge exchange.	**Short-Term:** • Conduct a comprehensive review of existing visa and immigration policies to identify areas for improvement in facilitating the relocation and employment of international AI experts. • Begin establishing partnerships with select international academic institutions to lay the groundwork for future collaboration on AI research and talent exchange programs. • Initiate discussions with industry leaders to understand their requirements for attracting global AI talent and explore potential collaboration opportunities to enhance the attractiveness of career prospects in the local AI ecosystem. • Develop a plan for organizing networking events, conferences, and workshops to kickstart efforts in connecting with global AI talent and showcasing opportunities within the local AI community. **Medium-Term:** • Implement streamlined visa and immigration policies based on the outcomes of policy review, making it more convenient for international AI experts to relocate and work in the country. • Formalize partnerships with international academic institutions through signed agreements, enabling structured collaboration on AI research, talent exchange programs, and joint faculty appointments. • Actively collaborate with industry partners to implement initiatives aimed at creating attractive career opportunities and incentives for global AI talent, ensuring alignment with industry needs and standards. • Host networking events, conferences, and workshops to bring together global AI talent and local stakeholders, fostering collaboration, knowledge exchange, and potential recruitment opportunities. **Long-Term:** • Continuously refine and optimize visa and immigration policies based on feedback and evaluation, ensuring that they remain conducive to attracting and retaining top global AI talent in the long term. • Strengthen and expand partnerships with a broader range of international academic institutions, establishing a robust network for ongoing collaboration in AI research and talent exchange.	General measures of progress include: • **Influx of International AI Experts:** Monitor the rise in the number of international AI experts relocating to the country. • **Engagement Metrics:** Evaluate the attendance and active participation rates of global AI talent in networking events. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q24. Is there sufficient AI talent to meet the manpower demands in the private sector?	The Department of Home Affairs (DHA) in Australia launched the Global Talent program to attract high-skilled talents in various areas, which include AI and machine learning. The program provides permanent visas for individuals who are experienced in deep tech, and driving innovations in AI, cloud, amongst others.[142] Additionally, the DHA offers the Global Talent Employer Sponsored (GTES) program to enable employers from established businesses or start-ups to bring high-skilled experts to Australia to work in niche positions, or in roles in tech-based or STEM field.[143]

[142] Australian Government Department of Home Affairs(2024), Visas for Innovation, https://immi.homeaffairs.gov.au/visas/working-in-australia/visas-for-innovation/global-talent-independent-program
[143] Migration Affairs, Global Talents Programs, https://migrationaffairs.com.au/migration-services/global-talent-programs/

		• Consolidate and expand industry collaboration efforts, establishing sustainable mechanisms for industry engagement in talent attraction and retention initiatives, supported by long-term strategic partnerships. • Garner global recognition for the local AI ecosystem as a hub for talent and innovation through continued participation and hosting of high-profile networking events, conferences, and workshops, solidifying its position on the global stage.		
A2.4.5 Support Workforce Transition and Job Redesign	• **Skills Assessment and Training Programs:** Implement comprehensive skills assessment programs to identify existing workforce capabilities and areas for development. Develop tailored training programs focused on AI-related skills and job redesign techniques to facilitate workforce transition. • **Job Reskilling and Upskilling Initiatives:** Launch initiatives to reskill and upskill workers in sectors vulnerable to AI-driven automation. Provide training in emerging technologies, such as AI, data science, and machine learning, along with soft skills development to enhance adaptability and resilience in the workforce. • **Collaboration with Industry Partners:** Foster collaboration with industry partners to identify evolving skill requirements and job roles in the context of AI adoption. Develop joint training programs, apprenticeships, and mentorship opportunities to ensure alignment between workforce	**Short-Term:** • Identify sectors and industries experiencing workforce displacement due to AI adoption. • Administer comprehensive skills assessments across industries to identify specific AI-related training needs and areas for job redesign. • Create tailored training modules focusing on advanced AI concepts, digital skills, and job redesign strategies relevant to the needs of workers in diverse sectors. • Establish partnerships with leading industry players, educational institutions, and training providers to design and deliver targeted training programs aligned with industry demands. **Medium-Term:** • Roll out targeted training initiatives tailored to key sectors, such as healthcare, finance, and manufacturing, to address sector-specific challenges and opportunities related to AI adoption and job redesign. • Continuously monitor and evaluate the effectiveness of training programs, adjusting content and delivery methods as needed to ensure optimal outcomes and participant engagement. • Increase access to AI-related training opportunities for workers through online platforms, mobile applications, and flexible learning formats, reaching a wider audience and promoting lifelong learning. **Long-Term:** • Conduct longitudinal studies to assess the long-term economic impact of workforce transition and job redesign efforts, measuring indicators such as productivity gains, innovation levels, and employment stability. • Establish mechanisms for ongoing skills development and upskilling, including mentorship programs, professional networking events, and AI-focused continuing education courses, to support career advancement and adaptability in an evolving AI-driven economy. • Implement policies and initiatives aimed at promoting inclusive growth and reducing disparities in access to	General measures of progress include: • **Training Participation Rates:** Measure the number of workers participating in workforce transition and job redesign programs to gauge the level of engagement and uptake. • **Employment Placement Rate:** Track the percentage of trained individuals who successfully secure employment in relevant AI sectors or industries, reflecting the success of workforce development programs in facilitating job placement. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q24. Is there sufficient AI talent to meet the manpower demands in the private sector?	In the Flanders region of Belgium, the Flemish regional government planned to equip the current and future workforce through several initiatives. The government established the Flemish AI Academy which aims at creating and distributing courses on AI to students, PhD candidates and professionals. These courses include topics such as basic AI concepts, AI for automation, responsible AI, etc. These courses are designed to help the current and future workforce to transition to AI related roles.[144] Additionally, the Flemish government set up another AI Academy with the Howest University of Applied Sciences and the Flemish Employer's Organization Voka to offer seminars and trainings to business owners interested in adopting AI applications.[145]

[144] AI Watch (2021), Belgium AI Strategy Report, https://ai-watch.ec.europa.eu/countries/belgium/belgium-ai-strategy-report_en#human-capital
[145] *Ibid.*

	capabilities and industry needs, facilitating smooth transitions and career advancement.	AI-related opportunities, ensuring that all segments of the population can benefit from advancements in AI technology and participate fully in the digital economy.		
A2.4.6 Implement Lifelong Learning Initiatives	• **Advanced Curriculum Enhancement:** Collaborate with civil society organizations and non-government organizations to enhance existing lifelong learning initiatives focusing on intermediate-level training to address AI application issues and higher-level training to develop advanced AI capabilities. Integrate training/coursework on ethical considerations and responsible AI practices to ensure that learners are equipped to navigate complex AI environments. • **Responsible AI Certification:** Collaborate with AI industry association and industry partners to introduce certification programs specifically focused on responsible AI practices, acknowledging individuals who demonstrate proficiency in ethical AI development and deployment through lifelong learning endeavors. • **Ethical Awareness Campaigns:** Launch educational campaigns to raise awareness about responsible AI practices and the importance of ethical considerations in AI development, encouraging lifelong learners to prioritize	**Short-Term:** • Conduct needs assessment surveys and consultations with civil society organizations and NGOs to identify areas for curriculum enhancement in existing lifelong learning initiatives. • Develop initial drafts of intermediate-level and advanced AI training modules and coursework, integrating ethical considerations and responsible AI practices. • Initiate discussions with AI industry associations and partners to outline the framework for responsible AI certification programs and establish collaboration agreements. • Begin planning and content creation for ethical awareness campaigns, outlining key messages and target audiences. **Medium-Term:** • Implement enhanced curriculum modules in existing lifelong learning initiatives, focusing on intermediate-level and advanced AI training to address application issues and develop advanced capabilities. • Pilot test responsible AI certification programs with a select group of participants to validate program effectiveness and adjust certification criteria as needed. • Launch ethical awareness campaigns across various platforms and channels, leveraging partnerships with media outlets, educational institutions, and online platforms to reach a broader audience. **Long-Term:** • Scale up the integration of enhanced AI training modules into lifelong learning initiatives nationwide, ensuring accessibility and inclusivity for learners from diverse backgrounds. • Expand the reach of responsible AI certification programs to a wider audience, including professionals from various sectors and industries, and establish a formal accreditation process. • Evaluate the impact of ethical awareness campaigns on public awareness and understanding of responsible AI practices, refining campaign strategies based on feedback and outcomes to ensure long-term effectiveness.	General measures of progress include: • **Integration of Intermediate and Advanced AI Training Modules in Lifelong Learning Initiatives:** Monitor the adoption of intermediate and advanced AI training modules within lifelong learning programs. • **Implementation Rate:** Monitor the integration of responsible AI principles into lifelong learning initiatives and curriculum enhancements across educational institutions and training programs. • **Certification Rate:** Track the number of individuals obtaining responsible AI certification, indicating the uptake and success of the certification programs. • **Awareness Metrics:** Assess the effectiveness of ethical awareness campaigns by measuring changes in public awareness and understanding of responsible AI practices through surveys or online analytics. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q31. Do NGOs, CSOs, and other citizen organizations provide skilling, reskilling, or upskilling training opportunities for employees in AI-related skills, and specifically in responsible AI implementation/deployment? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	As part of the Flemish AI Plan, the Belgian regional government established the Knowledge Center Data & Society to provide training, advice and guidance on responsible AI development to industry, civil society, academia, and the general public.[146] The Center provides a depository of responsible AI assessment tools to the industry, teaching materials to teachers to support AI curriculum development, and online courses on ethical AI concepts and regulations to raise awareness on the responsible AI practices.[147]

[146] Knowledge Center Data & Society (2024) Our mission, https://data-en-maatschappij.ai/missie
[147] Knowledge Center Data & Society (2024) Practice, https://data-en-maatschappij.ai/missie

	responsible AI principles in their skill development journey.		• Q36. Does the AI industry association implement responsible AI measures?	

'PROMISING' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[148]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	P2.5 Accelerate AI Adoption Among Businesses of all Sizes (Multinationals, MSMEs, and Start-Ups)			
Objective(s)	• **Economic Growth and Global Competitiveness:** Accelerating AI adoption among all businesses in ASEAN, including large corporations, MSMEs, and start-ups to catalyze economic growth and bolster competitiveness on a global scale – driving innovation, productivity, and market expansion. • **Solving Local Challenges:** Start-ups and MSMEs possess the potential to develop AI solutions that effectively tackle localized challenges spanning healthcare, agriculture, education, and more. Through the deployment of AI solutions and platforms, these enterprises can enhance access to critical services, optimize resource allocation, and elevate overall societal well-being. • **Inclusive Development and Employment Opportunities:** Championing AI adoption among businesses promotes inclusive development and fosters job creation. By equipping large and small businesses with AI capabilities, opportunities for entrepreneurship, skill acquisition, and employment are amplified, contributing significantly to poverty alleviation and socio-economic inclusivity.			
P2.5.1 Support AI Adoption among all businesses, with a special focus on start-ups and MSMEs	• **Provide Access to Resources and Infrastructure:** Offer start-ups and MSMEs access to essential resources like cloud services and AI tools to reduce barriers to AI adoption. • **Offer Training and Education Programs:** Develop tailored training programs to enhance understanding and practical skills in AI technologies through workshops, webinars, and mentorship. • **Facilitate Funding and Investment Opportunities:** Provide grants/subsidies for AI projects, and support networking events to connect start-ups and MSMEs with investors and collaborators.	**Short-Term:** • Establish partnerships with cloud service providers to offer discounted or subsidized access to cloud services for start-ups and MSMEs. • Develop introductory workshops and webinars on AI technologies to provide basic knowledge and awareness for start-ups and MSMEs. • Host networking events to connect start-ups and MSMEs with potential investors and collaborators. **Medium-Term:** • Expand access to AI tools by providing licenses or subscriptions at reduced rates for start-ups and MSMEs. • Develop more advanced training programs on specific AI applications and tools to enhance practical skills and knowledge. • Increase funding support for AI projects by offering grants or subsidies specifically targeted at start-ups and MSMEs. • Organize mentorship programs to provide personalized guidance and support for start-ups and MSMEs in implementing AI technologies. **Long-Term:** • Establish a dedicated AI resource center or hub where start-ups and MSMEs can access a wide	General measures of progress include: • **Number of AI-enabled Start-ups and MSMEs:** Tracking the increase in the number of start-ups and MSMEs that have adopted AI technologies in their operations. • **AI Investment in Start-ups/MSMEs:** Measuring the amount of funding or investment directed towards AI initiatives and projects undertaken by start-ups and MSMEs. • **AI Start-up/MSME Growth:** Track the number of AI start-ups/MSMEs supported and their growth trajectory, including factors such as funding received, product development milestones achieved, and market penetration. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q21. Do the public and private sectors have the infrastructure to develop, deploy, and adopt AI solutions? • Q22. Does the government develop, deploy, and adopt AI solutions to enhance the delivery of public services?	IMDA and EnterpriseSG in Singapore launched the Generative AI Sandbox for SMEs in February 2024. The objective of the Sandbox is to allow SMEs to gain access to 13 GenAI solutions focusing on marketing, sales, and customer engagements.[149] SMEs that successfully apply to participate in the Sandbox will receive grant support from IMDA to trial preferred solutions for three months.[150] The Sandbox is expected to reach 300 SMEs in Singapore. [151]

[148] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[149] IMDA (2024), Singapore's first generative AI Sandbox to familiarize and help SMEs get head start in capturing new AI opportunities, www.imda.gov.sg/resources/press-releases-factsheets-and-speeches/press-releases/2024/sg-first-genai-sandbox-for-smes
[150] *Ibid.*
[151] *Ibid.*

		range of resources, including cloud services, AI tools, and expert guidance. ● Develop advanced training programs and certifications in AI for start-ups and MSMEs to further enhance their expertise and capabilities. ● Implement sustained funding and investment support mechanisms, such as venture capital funds or innovation grants, to encourage continued AI adoption and innovation among start-ups and MSMEs. ● Foster a vibrant ecosystem of collaboration and innovation by regularly hosting AI-focused events, conferences, and hackathons to bring together start-ups, MSMEs, investors, and industry experts.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[152]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**P2.6 Strengthen Data and Digital Literacy Skills, With a Focus on the Usage, Processing, and Analysis of Datasets in AI Systems and Platforms**			
Objective(s)	• **Prepare a Future-Ready AI Workforce:** Collaborate with academia and private sector partners to update and align educational curricula with the latest AI industry trends and ethical considerations. This collaboration aims to equip students with relevant knowledge, skills, and internship experiences as they enter AI-relevant sectors and industries. • **Align AI Initiatives with Labor Demands:** Foster collaboration between policymakers, academia, and the private sector to ensure that AI-driven initiatives are in line with specific labor market demands and industry priorities, effectively meeting evolving industry needs. • **Enhance Workforce Competitiveness:** Implement upskilling and reskilling programs to boost the competitiveness of the workforce in the AI-driven economy, ensuring they possess the necessary skills and knowledge for emerging technological advancements. • **Promote Talent Attraction and Retention:** Develop incentive programs aimed at attracting and retaining AI talent within the workforce and encouraging their active participation in AI research, design, development, and deployment.			
P2.6.1 Integrate AI in Higher Education	• **Integrate AI Education into STEM Curricula:** Regularly update STEM curricula to include the latest advancements in data analytics and AI technologies, ensuring students are equipped with relevant skills. Introduce AI concepts across disciplines to raise awareness of its applications and collaborate with AI experts to expose students to real-world use cases and governance considerations. • **Career Readiness:** Partner with the private sector to provide internship opportunities for students in AI-related fields. Ensure educational curricula are aligned with current industry trends and anticipate the requirements of upcoming AI-trained graduates. • **Strengthen Educator Competencies:** Equip educators and trainers with necessary expertise and abilities to effectively deliver AI upskilling programs and promote ethical AI practices. Facilitate secondment opportunities for professors and lecturers at educational institutions to gain practical experience with AI advancements by working within private sector AI firms. This	**Short-Term:** • Conduct a comprehensive review of existing STEM curricula to identify areas for integration of AI education. • Initiate discussions with potential private sector partners to explore internship opportunities for students in AI-related fields. • Evaluate the current competencies of educators in AI education to determine training needs and priorities. This includes expanding the scope and scale of research and education fellowships / exchanges. • Conduct a thorough assessment of educator competencies to identify gaps in knowledge and skills related to AI upskilling and ethical AI practices. • Establish partnerships between educational institutions and private sector AI firms to facilitate secondment opportunities for educators. **Medium-Term:** • Update STEM curricula to incorporate foundational concepts of AI and data analytics, ensuring students are exposed to relevant skills and knowledge. • Forge partnerships with private sector organizations to offer internship opportunities for students in AI-related fields, providing them with practical experience. • Develop and implement targeted training programs and workshops to enhance educators' understanding of AI in both the technical aspects and ethical considerations. • Implement secondment programs, allowing educators to spend time working within AI firms to gain practical experience and insights.	General measures of progress include: • **Curriculum Integration Assessment:** Measure the extent of integration of AI education into existing STEM curricula by conducting a comprehensive review and identifying areas for improvement. • **Partnership Engagement:** Track the progress of discussions and collaborations with private sector partners to explore and establish internship opportunities for students in AI-related fields, assessing the number and quality of partnerships formed. • **Internship Participation:** Monitor the number of students participating in internship opportunities in AI-related fields, tracking the growth over time to gauge the effectiveness of partnership engagements and the attractiveness of the internships to students. • **Educator Competency Evaluation:** Evaluate the effectiveness of training programs aimed at enhancing educators' competencies in AI education delivery by assessing the participation rates, feedback from participants, and observable improvements in teaching practices. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework:	The Norwegian government introduced a suite of policies which aimed at integrating AI at different levels of education under its National AI Strategy released in 2021. At the primary and secondary levels, the Norwegian government reformed digital skills education to include more programming and computation thinking components.[153] At the tertiary level, the government expanded the ICT curriculum to include AI, robotics, machine learning, computer vision, deep learning and big data analysis.[154] Education opportunities are offered specifically to schoolteachers to equip them with AI skills and knowledge.[155] Furthermore, the government increased PhD positions to allow employees of different

[152] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[153] European Commission (2021) Norway AI Strategy Report, https://ai-watch.ec.europa.eu/countries/norway/norway-ai-strategy-report_en
[154] *Ibid.*
[155] *Ibid.*

		knowledge exchange can then be incorporated back into academic programs, ensuring a future workforce well-versed in both the technical aspects and ethical considerations of AI.	**Long-Term:** • Expand AI education in STEM curricula to cover more advanced topics and applications, catering to evolving industry demands. • Increase the number of internship opportunities in AI-related fields through broader collaboration with industry partners. • Develop long-term strategies to sustain educator competencies in AI upskilling and ethical AI practices, ensuring ongoing professional development opportunities.	• Q25. Do universities offer undergraduate/graduate/postgraduate courses on AI, and specifically, on a responsible approach to AI?	companies to undertake AI research projects that align with their companies' business needs.[156]
	P2.6.2 Upskill and Reskill the Workforce	• **Workforce Skills Assessment:** Governments and private sector entities can collaborate closely to conduct a comprehensive analysis of the labor market, pinpointing specific skill gaps and areas of demand. This data-driven approach informs the development of targeted training and development initiatives to address workforce needs effectively. • **Upskilling and reskilling the workforce:** Governments can collaborate closely with the public and private sectors to create platforms and resources for employee upskilling. Facilitate joint efforts to organize sector-specific AI courses and forums, aligning with the identified skills gap and areas of demand from the Workforce Skills Assessment. Ensure these training initiatives integrate ethics and governance principles to cultivate ethical AI practices among professionals.	**Short-Term:** • Establish collaborative platforms between governments, public, and private sectors for upskilling/reskilling resources. • Conduct a workforce skills assessment to identify key industries and sectors experiencing skill gaps and areas of high demand. • Design and develop sector-specific AI courses and training materials tailored to address identified skill gaps and areas of demand. • Initiate discussions with the private sector, civil society, and non-government organizations on integrating ethics and governance principles into training initiatives. **Medium-Term:** • Roll out AI training programs and initiatives in collaboration with industry partners, focusing on upskilling and reskilling the workforce to meet the demands of emerging AI technologies. • Incorporate ethics and governance principles into AI training curricula to ensure professionals are equipped with the knowledge and understanding of responsible AI practices. • Implement mechanisms for monitoring and evaluating the effectiveness of training initiatives, including feedback mechanisms from participants and assessment of skill acquisition. **Long-Term:** • Scale up the reach and impact of AI training programs to cover a broader segment of the workforce and address evolving skill requirements in the AI landscape. • Continuously refine and update training programs based on feedback, emerging trends in AI, and evolving skill demands in the workforce.	General measures of progress include: • **Program Engagement and Participation:** Measure the level of engagement and participation in training programs. • **Employment Placement Rate:** Track the percentage of trained individuals who successfully secure employment in relevant AI sectors or industries, reflecting the success of workforce development programs in facilitating job placement. • **Skill Gap Reduction Rate:** Measure the reduction in identified skill gaps within the labor market over time, indicating the effectiveness of training and development initiatives in addressing workforce needs. • **Integration of Ethics and Governance:** Track the integration and adoption of ethics and governance principles into AI training programs. Evaluate the depth and comprehensiveness of ethical considerations and governance frameworks taught in these programs, and measure practitioners' awareness of ethical principles and practices in AI development and deployment. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q24. Is there sufficient AI talent to meet the manpower demands in the private sector?	In order to improve the skills and knowledge of the general population on AI, the Finnish government supported the University of Helsinki and Reaktor Education in developing "Elements of AI".[157] The online course is designed to provide training to all age groups in Finland on the impacts and applications of AI. Since its inception, the course trained more than 2% of the population in Finland.[158] It has also been translated into 24 EU languages to facilitate access across the European Union.[159]

[156] *Ibid.*
[157] OECD (2020), Embracing Innovation in Government, https://trends.oecd-opsi.org/wp-content/uploads/2020/11/OECD-Upskilling-People-11_16_20-V7.pdf
[158] *Ibid.*
[159] *Ibid.*

		• Institutionalize the integration of ethics and governance principles as core components of all training programs, ensuring their ongoing incorporation into curriculum development and delivery.		
P2.6.3 Attract and Retain AI Talent	• **Incentive Programs for AI Talent Retention and Engagement:** Develop incentive programs aimed at retaining AI talent within the workforce and encouraging their active participation in AI research, design, development, and deployment. • **Scholarship programs for AI talent development:** Establish scholarship programs targeting individuals interested in pursuing education and training in AI-related fields, including undergraduate, graduate, and postgraduate studies.	**Short-Term:** • Develop the framework for incentive programs aimed at retaining AI talent, including defining eligibility criteria and outlining the types of incentives offered. • Initiate the process of establishing scholarship programs for AI talent development by conducting a needs assessment and defining the scope of the scholarships. **Medium-Term:** • Launch pilot incentive programs in select organizations to gauge effectiveness and gather feedback for program refinement. • Roll out scholarship programs for AI talent development, starting with undergraduate and graduate studies, and gradually expanding to postgraduate studies. **Long-Term:** • Scale up incentive programs for AI talent retention and engagement nationwide, based on the success of pilot initiatives and feedback received. • Establish a sustainable framework for scholarship programs, ensuring continuous funding and accessibility to individuals interested in AI-related education and training at all academic levels.	General measures of progress include: • **Employment Retention Rates:** Measure the percentage of AI talent retained within the workforce over time, indicating the effectiveness of incentive programs in retaining skilled professionals. • **Scholarship Uptake and Graduation Rates:** Monitor the uptake of AI-related scholarships and the graduation rates of students in AI-related fields, indicating the success of scholarship programs in developing AI talent. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q24. Is there sufficient AI talent to meet the manpower demands in the private sector.	The United States government released the "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence" last year to direct society-wide efforts in the responsible use and development of AI. In particular, the Executive Order directs various departments to undertake measures to attract and retain AI talent in the United States. These measures include streamlining the processing time for visa applications for top talents, establishing programs to connect AI experts to research and employment opportunities, and publish guides for AI experts to consider employment options in the United States in multiple languages. [160]

[160] The White House (2023), Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence, www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence

'EMERGING' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[161]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	E2.7 **Build Foundational Digital Skills and Knowledge, Including Fundamental Data Literacy and AI Awareness/Understanding**			
Objective(s)	• **Meet Manpower Demand:** By promoting digital literacy and upskilling the workforce, the economy can proactively meet the growing demand for manpower in AI-related fields and position itself more competitively to participate in AI-driven sectors. • **Integrate AI in Higher Education:** Enhance university curricula to include foundational digital literacy and AI concepts, fostering the development of a digitally literate and skilled workforce. • **Raising General Public Awareness on AI:** Launch campaigns and workshops to educate the general public on AI ethics and responsible usage, empowering individuals to engage with AI technologies responsibly, and participate in AI-related initiatives.			
E2.7.1 Workforce Upskilling	• **Training Initiatives:** Develop training programs for the workforce focusing on foundational AI concepts, digital literacy, and understanding of responsible AI practices. • **Industry Collaboration:** Establish public-private partnerships with local businesses, non-profit, and civil society organizations to create internship opportunities and entry-level positions that provide hands-on experience in the AI field, ensuring accessibility for individuals with limited prior exposure to digital technologies. • **Scholarships for Skill Development:** Introduce scholarship programs aimed at supporting individuals to pursue training and certification courses in AI, emphasizing practical skills development.	**Short-Term:** • Launch pilot training programs focusing on foundational concepts in responsible AI and digital literacy for selected target groups within the workforce. • Initiate discussions and negotiations with local businesses and organizations to explore potential collaboration opportunities for internship programs in AI. • Conduct feasibility studies and develop the framework for implementing scholarship programs for AI skill development. **Medium-Term:** • Expand training programs to reach a broader audience, incorporating feedback and adjustments based on initial pilot outcomes. • Establish formal partnerships with local businesses and organizations to launch internship programs, offering hands-on experience in AI projects. • Roll out scholarship programs for AI skill development, targeting underserved communities and individuals with limited access to educational resources. **Long-Term:** • Institutionalize training programs as part of ongoing workforce development initiatives, integrating AI concepts into standard educational curricula.	General measures of progress include: • **Training Program Evaluation:** Assess the effectiveness of training programs by tracking metrics such as participant satisfaction, knowledge retention rates, and post-training skill development. Conduct periodic evaluations to identify strengths, weaknesses, and areas for improvement in the training curriculum and delivery methods. • **Partnership Impact Assessment:** Measure the impact of public-private partnerships on workforce development by evaluating the number of internship opportunities created, the diversity of participating organizations, and the level of hands-on experience gained by interns. Monitor the career trajectories of program alumni to gauge long-term outcomes and industry integration. • **Scholarship Uptake and Outcome Analysis:** Monitor the uptake of scholarships for skill development in AI by tracking application rates, selection criteria adherence, and completion rates of training and certification courses. Assess the employability and career advancement of scholarship recipients post-training to determine the effectiveness of the scholarship program in bridging skill gaps and enhancing workforce readiness in the AI field. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q24. Is there sufficient AI talent to meet the manpower demands in the private sector?	The Monetary Authority of Singapore (MAS) launched the *Financial Sector Artificial Intelligence and Data Analytics (AIDA) Talent Development Program*. The program aims to increase the number of skilled workers who can develop and innovate AI solutions for the financial industry.[162] It does so by working with financial institutions, established training providers, and educational institutions to co-curate training programs and modules which incorporate the latest developments and trends in AI and analytics.[163]

[161] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[162] FinExtra (2023) MAS launches AI and data analytics talent program, www.finextra.com/pressarticle/96920/mas-launches-ai-and-data-analytics-talent-programme
[163] FinExtra (2023) MAS launches AI and data analytics talent program, www.finextra.com/pressarticle/96920/mas-launches-ai-and-data-analytics-talent-programme

		• Enhance and scale internship programs to accommodate a larger number of participants, fostering greater inclusion and diversity in the AI workforce. • Sustain and expand scholarship programs, continually adapting to evolving industry needs and technological advancements in AI.		
E2.7.2 Integrate AI in Higher Education	• **Curriculum Development:** Designing and developing structured modules and curricula covering essential digital literacy skills, AI fundamentals, and AI ethics. • **Curriculum Integration:** Enhance the existing academic programs in higher education institutes by integrating foundational digital literacy skills, and general understanding of AI concepts, including responsible AI, into relevant university courses. • **Educator Capacity Building:** Training and equipping educators and trainers with the necessary knowledge and skills to effectively deliver digital literacy and AI upskilling programs.	**Short-Term:** • Develop structured modules and curricula covering digital literacy skills, AI fundamentals, and AI ethics. • Conduct initial training sessions for educators and trainers to familiarize them with the content and delivery methods. **Medium-Term:** • Integrate digital literacy skills and AI concepts into relevant university courses. • Expand educator capacity building programs to reach more educators and trainers across different institutions. **Long-Term:** • Integrate digital literacy skills and AI concepts into relevant university courses. • Expand educator capacity building programs to reach more educators and trainers across different institutions.	General measures of progress include: • **Curriculum Implementation Rate:** Measure the extent to which the newly developed curriculum is being implemented across educational institutions. Track the adoption of the structured modules and curricula in schools and universities, assessing the coverage of essential digital literacy skills, AI fundamentals, and AI ethics in the education system. • **Evaluation of Curriculum Integration Effectiveness:** Evaluate the effectiveness of curriculum integration by assessing student learning outcomes and performance indicators. Monitor changes in student knowledge, attitudes, and behaviors related to digital literacy and AI concepts after the integration of relevant modules into academic programs. Conduct surveys or assessments to gather feedback from students and educators on the impact of curriculum integration on learning experiences. • **Educator Competency Assessment:** Assess the competency levels of educators and trainers in delivering digital literacy and AI upskilling programs. Evaluate the effectiveness of educator capacity building initiatives by measuring improvements in educators' knowledge, pedagogical skills, and confidence in teaching digital literacy and AI concepts. Use pre- and post-training assessments, classroom observations, and feedback mechanisms to gauge educator readiness and effectiveness in delivering the curriculum. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q25. Do universities offer undergraduate/graduate/postgraduate courses on AI, and specifically, on a responsible approach to AI?"	As part of its National AI Strategy, Singapore has been enhancing the capabilities of the Singapore Student Learning Space (SLS) with AI learning tools in order to support student learning and complement the professional practice of teachers.[164] At the same time, Singapore's Institutes of Higher Learning (IHLs) are also utilizing AI tools in the learning process. In the polytechnics and Institute of Technical Education, students are equipped with basic AI capabilities, and are free to pursue specialized AI diplomas. The Autonomous Universities offer modules that allow students to explore AI technologies as a tool to specialize in their areas.[165]
E2.7.3 Raising General Public Awareness on Responsible AI	• **Public Awareness Initiatives:** Launch awareness campaigns to inform the general public about basic AI ethics, data privacy, and security, focusing on everyday applications.	**Short-Term:** • Plan and design the content and messaging for the awareness campaigns. • Identify target communities and locations for conducting the initial round of workshops.	General measures of progress include: • **Awareness Campaign Reach:** Measure the reach and impact of public awareness campaigns by tracking metrics such as the number of people reached through various communication channels (e.g., social media, traditional media, community events), website visits, social media engagement, and attendance at awareness	The Malaysian government, through MyDIGITAL Corporation, an agency under the Ministry of Digital, has launched the *Artificial Intelligence for Citizens* program (*AI Untuk Rakyat*) in collaboration with Intel.[166] The program is aimed at raising the

[164] Ministry of Education Singapore (2023) Artificial intelligence in education, www.moe.gov.sg/education-in-sg/educational-technology-journey/edtech-masterplan/artificial-intelligence-in-education
[165] Ministry of Education Singapore (2023) Incorporating Artificial Intelligence into the curriculum, www.moe.gov.sg/news/parliamentary-replies/20230703-incorporating-artificial-intelligence-into-the-curriculum
[166] Malay Mail (2024) Rafizi: Govt launches AI Untuk Rakyat program to boost AI literacy among Malaysians, www.malaymail.com/news/malaysia/2024/01/16/rafizi-govt-launches-ai-untuk-rakyat-programme-to-boost-ai-literacy-among-malaysians/112684

	• **Community Workshops:** Conduct interactive workshops in local communities to address common misunderstandings about AI and offer practical advice on its responsible use. • **Media Partnerships:** Forge partnerships with local media and community leaders to spread awareness about AI ethics and foster a culture of digital responsibility at a grassroots level.	• Initiate discussions with local media outlets and community leaders to explore partnership opportunities. **Medium-Term:** • Launch the first phase of awareness campaigns across selected regions or cities. • Conduct the initial series of community workshops to gauge engagement and gather feedback. • Finalize media partnership agreements and commence collaborative efforts to disseminate AI ethics messaging. **Long-Term:** • Expand the reach of awareness campaigns to reach a broader audience through various channels. • Scale up the community workshop program to reach more communities and neighborhoods. • Establish sustainable partnerships with local media and community leaders to ensure continuous engagement and awareness-building efforts.	events. Conduct surveys or interviews to assess changes in public knowledge, attitudes, and behaviors related to AI ethics, data privacy, and security following the campaigns. • **Community Workshop Attendance and Feedback:** Monitor the attendance and participation levels in community workshops on AI ethics and responsible use. Collect feedback from workshop participants through surveys or post-event evaluations to gauge the effectiveness of the workshops in addressing common misunderstandings about AI and providing practical advice. Measure changes in participants' knowledge, attitudes, and intentions regarding responsible AI practices before and after attending the workshops. • **Media Engagement Metrics:** Evaluate the effectiveness of media partnerships in spreading awareness about AI ethics by analyzing key performance indicators such as media coverage (number of articles, features, or segments), audience engagement (views, likes, shares, comments), and sentiment analysis (positive, neutral, negative). Track the reach and impact of media content related to AI ethics and responsible use, and assess whether the partnerships contribute to fostering a culture of digital responsibility at the grassroots level. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	literacy level of the public on AI, and therefore open opportunities to deepen technological knowledge that is essential in the digital world. It is an online self-learning program that has surpassed its one-year target of one million participants in less than six months since its launch in January 2024.

TARGETED PILLAR 3: RISK MITIGATION, MONITORING MECHANISMS, AND OPERATIONS MANAGEMENT

'ADVANCED' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[167]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A3.1 Strengthen Cybersecurity Policies, Mechanisms, and Toolkits to Mitigate AI Risks**			
Objective(s)	• **Mitigating AI-Related Risks:** Strengthening cybersecurity toolkits with AI safety and security guidelines helps identify and mitigate emerging threats, safeguarding AI systems from malicious activities, data breaches, and potential harm. • **Ensuring Responsible AI Development:** By integrating AI safety and security guidelines, including advanced threat intelligence mechanisms, authentication protocols, and data management practices, into cybersecurity toolkits, trust and confidence in the reliability and integrity of AI systems can be fostered and enhanced among stakeholders and users.			
A3.1.1 Strengthen Cybersecurity Toolkits to Mitigate AI Risks	• **Identification of AI-specific threats and risks:** Conduct research to identify and characterize emerging AI-specific vulnerabilities and attack vectors, such as adversarial examples, data poisoning, and model manipulation. Collaborate with various stakeholders such as industry partners and academia to co-develop threat models specific to different AI architectures and deployment scenarios to understand potential attack surfaces and risk profiles. • **Strengthen Cybersecurity Toolkits:** Incorporate AI safety and security guidelines and best practices, including advanced threat intelligence mechanisms, robust authentication and authorization protocols, and secure data management practices like encryption, access control, and data lifecycle management, into existing cybersecurity toolkits. • **Security Awareness and Training:** Develop training programs for cybersecurity professionals to equip them with the knowledge and skills needed to identify and mitigate AI-specific threats. Raise awareness among AI developers and stakeholders about security considerations	**Short-Term:** • Conduct initial research to identify and document emerging AI-specific vulnerabilities and threats. • Establish collaborations with industry partners and academia to gather diverse perspectives and insights for developing comprehensive threat models tailored to different AI architectures and deployment scenarios. • Begin developing initial threat models tailored to different AI architectures and deployment scenarios. • Initiate the integration of AI safety and security guidelines into existing cybersecurity toolkits, focusing on foundational aspects like threat intelligence mechanisms and authentication protocols. • Launch initial discussions and planning sessions for cybersecurity training programs aimed at cybersecurity professionals and AI developers. **Medium-Term:** • Complete research on AI-specific threats and risks, including comprehensive characterization and documentation of identified vulnerabilities and attack vectors. • Finalize and publish threat models specific to various AI architectures and deployment	General measures of progress include: • **Number of Identified AI-specific Threats:** Track the number of emerging AI-specific vulnerabilities and attack vectors identified through research efforts. • **Integration of AI Security Guidelines:** Monitor the extent to which AI safety and security guidelines are integrated into existing cybersecurity toolkits and practices. • **Training Program Participation:** Measure the participation rate in cybersecurity training programs among professionals, especially those focusing on AI-specific threats and mitigation strategies. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)? • Q29. Does the public/private sector have any AI risk assessment processes or mechanisms such as AI impact assessments that can identify potential	The National Institute of Standards and Technology released two frameworks and guidelines on cybersecurity and AI risks. In 2021, NIST published the NIST AI Risk Management Framework (AI RMF). The Framework aims to provide an approach which can be adopted by organizations and individuals to manage different AI risks and promote the responsible development and use of AI. Upon its publication, NIST launched the AI MRF Playbook, AI RMF Roadmap and the AI RMD Crosswalk to facilitate adoption.[168] It also established the Trustworthy and Responsible AI Resource Center to facilitate the adoption of AI RMF.[169] In 2024, NIST published the Adversarial Machine Learning: A Taxonomy and Terminology of Attacks and Mitigations (NIST.AI.100-2) to put AI RMF into practice. The publication contains four types of major AI attacks (evasion, poisoning,

[167] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[168] NIST (2023), AI Risk Management Framework, www.nist.gov/itl/ai-risk-management-framework
[169] *Ibid.*

	throughout the AI development lifecycle, from design to deployment.	scenarios, providing detailed insights into potential attack surfaces and risk profiles. • Integrate AI safety and security guidelines and best practices into existing cybersecurity toolkits, ensuring compatibility and usability for cybersecurity professionals. • Develop and begin implementing cybersecurity training programs, covering AI-specific threat identification and mitigation techniques, for professionals in relevant fields. **Long-Term:** • Establish ongoing research efforts to continually monitor and update the landscape of AI-specific threats and risks, ensuring adaptability to evolving security challenges. • Maintain and update threat models as new AI technologies emerge and deployment scenarios evolve, ensuring continued relevance and accuracy. • Enhance cybersecurity toolkits with advanced AI safety and security features, leveraging ongoing advancements in AI research and cybersecurity best practices. • Institutionalize cybersecurity training programs as part of standard professional development initiatives for AI developers and cybersecurity professionals, ensuring a continuous focus on security throughout the AI development lifecycle.	risks and harms associated with AI technologies (either self-erected measures or imposed by the national government)? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	privacy, and abuse attack), and outlines approach on how these attacks can be mitigated.[170]

[170] NIST (2024), NIST Identifies Types of Cyberattacks That Manipulate Behavior of AI Systems, www.nist.gov/news-events/news/2024/01/nist-identifies-types-cyberattacks-manipulate-behavior-ai-systems

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[171]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A3.2 Build Capabilities in Privacy-Enhancing Technologies (PETs) and Other Novel Technologies**			
Objective(s)	• **Safeguarding User Privacy:** Building capabilities in PETs and other novel technologies helps fortify data privacy and security in AI applications, ensuring that sensitive user information is protected against unauthorized access, data breaches, and misuse. This fosters trust among users and promotes the ethical and responsible use of AI technologies. • **Unlocking Data Potential Responsibly:** By investing in PETs and novel technologies such as federated learning, organizations can enable collaborative data analysis while safeguarding individual privacy. This ensures responsible utilization of data, maximizing its potential to drive AI innovation while mitigating privacy risks and maintaining ethical standards in data handling.			
A3.2.1 Build Capabilities in Privacy-Enhancing Technologies (PETs) and other novel technologies	• **Invest in R&D Initiatives:** Invest in research and development initiatives focused on Privacy-Enhancing Technologies (PETs) and other novel technologies such as differential privacy, homomorphic encryption, and federated learning to fortify data privacy and security in AI applications. • **Training and Capacity Building:** Develop training programs and workshops to build expertise in PETs and other novel technologies among AI developers, data scientists, and cybersecurity professionals. Provide resources and support for educational institutions to integrate PETs-related coursework into their curricula, ensuring a pipeline of skilled professionals capable of implementing data privacy and security measures in AI systems. • **Adoption and Implementation Support:** Offer grants, subsidies, and technical assistance programs for organizations to adopt and implement Privacy-Enhancing Technologies and other novel technologies in their AI applications.	**Short-Term:** • Allocate initial funding for research and development initiatives focused on PETs and other novel technologies to kickstart innovation in data privacy and security. • Develop pilot training programs and workshops to introduce PETs and other novel technologies to AI developers, data scientists, and cybersecurity professionals, laying the groundwork for capacity building. **Medium-Term:** • Monitor progress in R&D initiatives, tracking advancements in PETs and other novel technologies such as differential privacy, homomorphic encryption, and federated learning. • Expand training programs and workshops to reach a wider audience of AI stakeholders, including industry professionals and policymakers, to deepen expertise in privacy-enhancing technologies and other novel technologies. **Long-Term:** • Provide ongoing support and assistance to organizations for the adoption and implementation of PETs and other novel technologies in their AI applications, ensuring smooth integration and compliance with privacy regulations. • Continuously evaluate the effectiveness of PETs and other novel technologies in enhancing data privacy and security in AI systems, iterating on solutions to address emerging challenges and evolving threats.	General measures of progress include: • **Research Output:** Measure the number of research projects and publications related to PETs and other novel technologies, indicating progress in R&D initiatives. • **Training Participation:** Track the participation rates in PETs training programs and workshops among AI developers, data scientists, and cybersecurity professionals, indicating the uptake of capacity-building efforts. • **Adoption Rate:** Monitor the number of organizations adopting and implementing PETs and other novel technologies in their AI applications, reflecting the effectiveness of adoption and implementation support measures. • **Impact Assessment:** Conduct periodic assessments to evaluate the impact of PETs on enhancing data privacy and security in AI applications, considering factors such as reduction in data breaches and improved user privacy protections. • **Skilled Workforce:** Assess the availability of skilled professionals proficient in PETs and other novel technologies. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)?	The United States National Science Foundation and the United States Department of Energy (DOE) established the Research Coordination Network (RCN) focusing on PETs for machine learning and AI use cases.[172] The RCN aims to connect academia, industry, and government to support PETS deployment, development and adoption.[173] Specifically, the RCN will carry out conduct research into PETs technology, regulations, best practices, standards, and certifications.[174]

[171] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[172] OpenGov (2024), U.S. Launches Research Network for Privacy-Enhancing Technologies, https://opengovasia.com/2024/02/28/u-s-launches-research-network-for-privacy-enhancing-technologies/
[173] *Ibid.*
[174] *Ibid.*

		• Foster a mature ecosystem around PETs and other novel technologies, where research, training, and adoption efforts are seamlessly integrated into the AI development lifecycle, ensuring sustained improvements in data privacy and security practices.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[175]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	P3.3 Strengthen Data Protection **and Cybersecurity for the Enablement of Responsible** AI			
Objective(s)	• **Strengthen Data Protections in AI:** Revise and update comprehensive data protection regulations to address AI-specific challenges and mitigate associated privacy risks, with a focus on strengthening provisions related to data collection practices, processing techniques, and storage mechanisms in alignment with principles of fairness, accountability, and transparency to ensure heightened privacy safeguards in AI-driven data processing activities. • **Empower Developers and Deployers to Safeguard Data Privacy in AI:** Promote the adoption of Privacy-Enhancing Technologies (PETs) to enable developers and deployers to implement effective data privacy and protection measures throughout the AI lifecycle, including design, development, deployment. • **Improve and Strengthen Cybersecurity Frameworks and Mechanisms for AI**: Robust cybersecurity measures mitigate risks of data breaches and cyber-threats, thereby supporting a secure and ethical AI ecosystem.			
P3.3.1 Enhance Data Privacy Measures in AI	• **Comprehensive Review and Gap Analysis:** Conduct a comprehensive review of existing data protection regulations to identify gaps and areas needing updates to address AI-specific challenges and risks. • **Stakeholder Engagement:** Engage with stakeholders, including legal experts, AI practitioners, industry representatives, non-government, and civil society organizations, to gather insights and perspectives on areas needing revision. • **Revision of Data Protection Regulatory Frameworks**: Update data protection regulations to address AI-specific challenges and mitigate associated	**Short-Term:** • Initiate a comprehensive review of existing data protection regulations to identify gaps in addressing AI-specific challenges. • Organize workshops, meetings, or online surveys to gather insights from legal experts, AI practitioners, industry representatives, non-government, and civil society organizations. • Develop initial recommendations for revising data protection regulations based on the review and stakeholder feedback. **Medium-Term:** • Refine recommendations for revising data protection regulations, focusing on key areas like data collection practices, processing techniques, transparency requirements, and consent mechanisms for AI data use. • Draft revised regulations that incorporate principles of Fairness, Accountability, and Transparency. • Conduct public consultations on the proposed revisions to gather further feedback and ensure inclusivity. **Long-Term:** • Finalize and formally adopt updated regulatory frameworks for AI data.	General measures of progress include: • **Completion of the comprehensive review:** Track the progress and completion of the review of existing data protection regulations to identify gaps and areas needing updates to address AI-specific challenges and risks. • **Stakeholder Engagement and Participation:** Measure the level of engagement and participation of stakeholders in the review process, including attendance at meetings, workshops, and feedback sessions. Track the diversity and representation of stakeholder groups involved in the review, ensuring inclusion of relevant perspectives. • **Formal Adoption of Revised Regulations:** Obtain official endorsement or approval of the revised regulations by relevant authorities or legislative bodies. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and	The Personal Data Protection Commission of Singapore released the "Advisory Guidelines on Use of Personal Data in AI Recommendation and Decision Systems" in 2024. The Advisory Guidelines were developed based on consultations with stakeholders from various stakeholders, including representatives from the technology, finance, and legal sectors.[176] The objective of the Advisory Guidelines is to elaborate on how the Personal Data Protection Act 2012 in Singapore applies when organizations use personal data for developing and deploying AI systems. It also provides recommendations to organizations on safeguards and practices that can be put in place to enhance AI system transparency and trustworthiness.[177]

[175] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[176] Personal Data Protection Commission (2024) Responses to Feedback on Public Consultation on Proposed Advisory Guidelines on Use of Personal Data in AI Recommendation and Decision Systems, www.pdpc.gov.sg/-/media/files/pdpc/pdf-files/press-room/2024/closing-note-for-public-consultations-on-ag-on-use-of-personal-data-in-ai-systems_1mar2024.pdf
[177] Personal Data Protection Commission (2024), Advisory Guideline on Use of Personal Data in AI Recommendation and Decision Systems, www.pdpc.gov.sg/-/media/files/pdpc/pdf-files/advisory-guidelines/advisory-guidelines-on-the-use-of-personal-data-in-ai-recommendation-and-decision-systems.pdf

	privacy risks. Enhance provisions related to data collection practices, processing techniques, transparency requirements, and consent mechanisms to ensure heightened privacy protections in AI-driven data processing activities. Incorporate principles of fairness, accountability, and transparency into revised regulations to address ethical concerns and mitigate risks associated with AI technologies.	• Develop resources and training materials to educate stakeholders on the revised regulations and best practices for compliant AI development. • Monitor and evaluate the effectiveness of the revised regulatory frameworks and their impact on responsible AI development practices. • Continually review and update data protection regulations as needed to keep pace with evolving AI technologies and data privacy risks.	development, development of AI ethics and principles, and innovation?	
P3.3.2 Increase the Adoption of Privacy-Enhancing Technologies (PETs)	• **Promoting Privacy-Enhancing Technologies (PETs):** Introduce developers and deployers to data anonymization processes and data lineage tools to ensure data privacy and protection throughout the AI lifecycle. By introducing these techniques, stakeholders can better understand and implement effective measures to safeguard sensitive data during AI design, development, and deployment. • **Encouraging Adoption of Privacy-Enhancing Technologies (PETs):** Encourage the use of PETs to facilitate the collection, processing, analysis, and sharing of data while maintaining confidentiality and	**Short-Term:** • Organize workshops and training sessions targeting developers and deployers to familiarize them with data anonymization processes and data lineage tools. • Develop guidelines and best practices for incorporating PETs into AI projects. • Initiate pilot projects across different sectors to demonstrate the effectiveness and benefits of PETs in maintaining data privacy. **Medium-Term:** • Collaborate with organizations to create case studies showcasing successful use cases of data anonymization processes, data lineage tools, and PETs. • Increase workshop offerings and online training modules to reach a wider audience of developers and deployers. • Promote the adoption of data anonymization processes, data lineage tools, and PETs as good practices within the AI development community. **Long-Term:** • Expand training programs to reach a broader audience, including AI researchers, data scientists, and policymakers.	General measures of progress include: • **Number of developers and deployers trained on data anonymization processes and data lineage tools:** Track the number of participants who complete workshops and online training modules on Privacy-Enhancing Technologies (PETs). • **Number of successful pilot projects demonstrating the effectiveness of PETs in maintaining data privacy across different sectors:** Track the number of successfully completed piloted projects and assess the outcomes and effectiveness of PET application in maintaining data privacy. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)? • Q28. Does the public/private sector have any data governance and data sovereignty mechanisms or guidelines that include invisible/at-risk populations such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-erected measures or imposed by the national government)?	To promote safe use of data for AI research, the Personal Information Protection Committee (PIPC) of Korea introduced the "Pseudonymized Information Processing Guidelines". The Guidelines provide standards for the pseudonymization of structured and unstructured data, principles for identifying and controlling personal information risks when using pseudonymized data.[178] The Guidelines further includes 80 use cases collected from the academia, industry, and experts to demonstrate how pseudonymized data can be utilized in different sectors, including AI. [179]

[178] Personal Information Protection Committee (2023), In the era of artificial intelligence, standards for pseudonym processing for images, videos, voices, and texts have emerge, www.pipc.go.kr/np/cop/bbs/selectBoardArticle.do?bbsId=BS074&mCode=C020010000&nttId=9899
[179] *Ibid.*

	privacy, which would be especially useful in making selected government data freely available to organizations for AI development and deployment.	• Integrate data anonymization processes, data lineage tools, and PETs into existing AI development frameworks and platforms. • Develop certification programs to validate proficiency in utilizing data anonymization processes, data lineage tools, and PETs in AI projects/solutions/tools.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[180]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**P3.4 Promote the Adoption of Risk Mitigation Tools**			
Objective(s)	• **Empower Developers and Deployers to Mitigate Risk with AI Governance Tools:** Equip developers and deployers with AI governance tools that streamline documentation, validation processes, and overall AI governance implementation – ultimately enhancing risk mitigation.			
P3.4.1 Promote Adoption of AI Governance Tools	• **Educational Initiatives and Training Programs:** Develop and implement training programs and workshops aimed at raising awareness and offering practical guidance on utilizing various AI governance tools (such as model provenance tools, AI fairness tools, explainable AI tools, and AI Verify) among AI developers and deployers. • **Pilot Projects and Case Studies:** Launch pilot projects across diverse sectors to showcase the efficacy and advantages of AI governance tools in enhancing AI transparency, fairness, accountability, and reliability. Develop case studies highlighting successful deployments of model provenance tools, AI fairness tools, explainable AI tools, and AI Verify in real-world AI applications. • **Incentivize Adoption:** Offer financial incentives or grants to start-ups adopting AI governance tools and individuals seeking training on leveraging such tools for AI design, development, and deployment, thereby fostering wider adoption and proficiency in utilizing these essential Personal Data tools.	**Short-Term:** • Design workshops, online modules, or user guides on key AI governance tools (model provenance, fairness, explainability, and verification) for developers and deployers. • Identify sectors and organizations for pilot projects, and begin initial planning and setup for pilot projects. • Establish eligibility criteria and guidelines for financial incentives for start-ups and individuals. **Medium-Term:** • Develop advanced training modules based on feedback and emerging needs. Expand the reach of training programs to a wider audience. • Evaluate pilot project results and develop case studies from pilot projects. • Expand the scope and reach of pilot projects to additional sectors and regions. • Evaluate the effectiveness of incentive programs and adjust as needed. • Expand eligibility criteria to reach a broader range of participants. • Explore additional forms of support, such as mentorship or networking opportunities. **Long-Term:** • Develop formal certification programs for proficiency in AI governance tools. • Partner with educational institutions or industry associations to offer certification courses. • Use findings from pilot projects to inform policy recommendations and industry standards. • Integrate successful practices and methodologies from pilot projects into mainstream best practice guidelines. • Monitor and evaluate the impact of incentive programs on AI governance tool adoption, and adjust incentive	General measures of progress include: • **Number of developers and deployers trained on AI governance tools:** Track the number of participants who complete workshops and online training modules on AI governance tools. • **Success metrics in pilot projects:** Track the success metrics achieved in pilot projects, such as improvements in AI transparency, fairness, accountability, and reliability, serves as a key indicator of the practical effectiveness of AI governance tools in real-world applications. • **Adoption Rate and Impact of Incentives:** Track the adoption rate of AI governance tools among start-ups and individuals. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q29. Does the public/private sector have any AI risk assessment processes or mechanisms such as AI impact assessments that can identify potential risks and harms associated with AI technologies (either self-erected measures or imposed by the national government)? • Q37. Does the public/private sector have any bias and fairness detection mechanisms or measures such as algorithmic auditing that detect bias and ensure unbiased data sets, algorithm design, and AI implementation (either self-erected measures or imposed by the national government)?	AI Verify Toolkit was launched by IMDA in Singapore in 2023. The Toolkit is an open-sourced, free to use platform opened to users, service providers and developers.[181] The objective of Toolkit is to help stakeholders to validate the performance of AI systems using technical tests which check for fairness, explainability, and robustness.[182] Prior to the public release of the Toolkit, an international pilot was arranged and was participated by over 50 Singaporean and multinational companies.[183] Moving forward, IMDA will continue its effort to promote the adoption and use of AI Governance tools through the AI Verify Foundation. The non-profit foundation will focus on developing AI testing frameworks, standards, and best practices through working with industry, academia and experts.[184]

[180] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[181] AI Verify (2023), AI Governance Testing Framework and Toolkit, https://aiverifyfoundation.sg/downloads/AI_Verify_Primer_Jun-2023.pdf
[182] *Ibid.*
[183] Personal Data Protection Commission (unknown), Singapore's Approach to AI Governance, www.pdpc.gov.sg/help-and-resources/2020/01/model-ai-governance-framework
[184] ATXSG (2023), Fact Sheet- Open-sourcing of AI Verify and Set Up of AI Verify Foundation, www.imda.gov.sg/-/media/imda/files/news-and-events/media-room/media-releases/2023/06/7-jun---ai-annoucements---annex-a.pdf

		programs as necessary to address changing needs and priorities.		

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[185]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**P3.5 Establish a National Regulatory AI Testbed/Sandbox for AI Innovation**			
Objective(s)	• **Facilitate Responsible Innovation:** Encourage the establishment of a national testbed/sandbox to provide a controlled environment for AI industry players to test regulations, policies, and applications, fostering innovation while minimizing and mitigating potential risks associated with AI technologies. The AI testbed/sandbox can be developed for specific economic sectors based on AMS' priorities (finance, healthcare, etc.), or more within the public sector to advance AI procurement for e-government platforms and services. • **Promote Regulatory Compliance and Ethical AI Practices:** Create a government-facilitated testbed/sandbox that encourages AI industry players to comply with regulations and adopt ethical practices, ensuring that AI innovations align with legal standards and ethical principles while fostering industry growth. The AI testbed/sandbox can be developed in partnership with tech companies to benefit from their technical expertise and to ensure the solutions that are tested comply with ethical guidelines and practices.			
P3.5.1 Establish an AI Testbed/Sandbox	• **Development and Implementation of the AI Testbed/Sandbox:** Develop a designated AI testbed or sandbox to provide a controlled environment for industry players to test AI regulations, policies, and applications. Establish the infrastructure and framework necessary for the functioning of the testbed, including setting up appropriate technological infrastructure and legal frameworks. • **Regulatory Framework Design and Oversight:** Develop and implement regulatory frameworks governing the operation of the AI testbed/sandbox, ensuring adherence to ethical standards, data privacy regulations, and safety protocols. Establish oversight mechanisms to monitor the activities within the testbed, including regular audits, compliance checks, and reporting requirements. • **Stakeholder Engagement and Collaboration:** Facilitate collaboration and engagement between government agencies,	**Short-Term:** ***Development of Testbed Infrastructure:*** • Identify suitable location and resources for setting up the AI testbed/sandbox. • Establish the technological infrastructure required for testing AI applications. • Draft initial regulatory frameworks and policies governing the operation of the testbed. ***Initial Implementation:*** • Launch the AI testbed/sandbox with a pilot phase to test basic functionalities and assess feasibility. • Invite early adopters from the AI industry to participate in the pilot phase. • Conduct initial assessments to identify and address any technical or regulatory challenges. ***Stakeholder Engagement:*** • Initiate stakeholder engagement sessions to gather input and feedback on the testbed/sandbox setup. • Collaborate with government agencies, industry players, and relevant stakeholders to refine regulatory frameworks and oversight mechanisms. **Medium-Term:** ***Expansion and Enhancement:*** • Expand the scope and capabilities of the AI testbed/sandbox based on lessons learned from the pilot phase. • Introduce additional features and functionalities to accommodate a wider range of AI applications and testing scenarios.	General measures of progress include: • **Testbed Infrastructure Development:** Completion of the establishment of physical and technological infrastructure necessary for the AI testbed/sandbox. • **Regulatory Framework Implementation:** Development and implementation of regulatory frameworks and policies governing the operation of the AI testbed/sandbox. • **Industry Participation and Engagement:** Track the level of participation and engagement from industry players, including start-ups, SMEs, and multinational corporations, in testing AI regulations, policies, and applications within the testbed/sandbox. • **Number of Successful AI Solutions Incubated:** Track the number of AI solutions developed, tested, and incubated within the AI testbed/sandbox environment. Assess the success and impact of these AI solutions based on predefined criteria, such as commercial viability, societal benefit, and alignment with regulatory requirements. Track the adoption and deployment of successful AI solutions in real-world applications beyond the testbed/sandbox, demonstrating their scalability and practical relevance. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q26. Is there a designated testbed / sandbox facilitated by the government for AI industry players to test AI regulations, policies, and applications, in a way that minimizes and mitigates the potential risks associated with AI?	The Norwegian Data Protection Authority (NDPA) set up the Regulatory Sandbox for AI in 2021. The goal of the Sandbox is to assist public and private organizations to develop AI solutions that comply with privacy and data protection regulations in Norway. The Sandbox is governed by a framework developed by the NDPA which outlines the "objectives, statutory guidelines, requirements and other relevant information for potential participants in the Sandbox".[186] Since its inception in 2021, the Sandbox has received 52 applications from private and public sectors, covering themes such as transparency, fairness, bias, data minimization,

[185] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[186] Norwegian Data Protection Authority (2023), Evaluation of the Norwegian Data Protection Authority's Regulatory Sandbox for Artificial Intelligence, www.datatilsynet.no/contentassets/41e268e72f7c48d6b0a177156a815c5b/agenda-kaupang-evaluation-sandbox_english_ao.pdf

	industry players, academia, non-government and civil society organizations involved in AI development and regulation. Encourage participation from diverse sectors and industries to ensure comprehensive testing and evaluation of AI regulations, policies, and applications within the testbed/sandbox environment.	• Enhance regulatory frameworks to address emerging challenges and ensure alignment with evolving industry standards. ***Diverse and Inclusive Participation:*** • Increase participation from a diverse range of industry players, including start-ups, SMEs, and multinational corporations. • Collaborate with academic institutions and research organizations to facilitate research and development activities within the testbed/sandbox. ***Regulatory Compliance and Oversight:*** • Strengthen oversight mechanisms to ensure compliance with regulatory frameworks and ethical guidelines. • Conduct regular audits and evaluations to monitor the performance and impact of the AI testbed/sandbox. • Address any regulatory gaps or compliance issues identified through ongoing monitoring and evaluation. **Long-Term:** ***Sustainability and Continuity:*** • Establish long-term funding and support mechanisms to ensure the sustainability of the AI testbed/sandbox. • Institutionalize the operation of the testbed within the government framework to ensure continuity beyond initial implementation. • Develop a roadmap for future expansion and evolution of the testbed/sandbox in response to advances in AI technology and changing regulatory landscape. ***Knowledge Dissemination and Capacity Building:*** • Disseminate findings and best practices generated from the AI testbed/sandbox to the wider AI community through conferences, workshops, and publications. • Develop training programs and capacity-building initiatives to enhance the skills and expertise of stakeholders involved in AI testing and regulation. • Promote a culture of transparency and collaboration to foster trust and confidence in the AI ecosystem. ***Impact Assessment and Policy Refinement:*** • Conduct comprehensive impact assessments to evaluate the effectiveness and impact of the AI testbed/sandbox in achieving its objectives.	• Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies / frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)?	anonymization, and legal basis for processing.[187] In 2023, the NDPA requested an evaluation of the Sandbox to assess the impact of the Sandbox, and to utilize the learning to build other sandboxes in the future.[188] Recently, the NDPA began to expand the scope of the Sandbox to cover both traditional and Generative AI solutions.[189]

[187] *Ibid.*
[188] *Ibid.*
[189] Datatilsynet (2023), Time for Generative AI in the Sandbox, www.datatilsynet.no/en/news/aktuelle-nyheter-2023/time-for-generative-ai-in-the-sandbox/

		• Use findings from impact assessments to refine regulatory frameworks, policies, and oversight mechanisms to better address the needs and concerns of the AI industry and society at large. • Continuously adapt and evolve the AI testbed/sandbox to remain responsive to emerging challenges and opportunities in the field of AI.		

'EMERGING' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[190]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**E3.6 Strengthen Data Protection and Privacy Enforcement, and Build Cybersecurity Foundations**			
Objective(s)	• **Ensure Data Privacy:** Develop and implement comprehensive data protection regulations to safeguard personal data and privacy rights in AI applications, including clear guidelines for data handling and mechanisms for obtaining informed consent. This proactive approach to data privacy will mitigate the risk of unauthorized access or misuse of personal data in AI systems. • **Enhance Enforcement Mechanisms:** Strengthen enforcement of privacy rights by establishing regulatory bodies tasked with monitoring and enforcing data protection laws. This will help mitigate the risk of non-compliance and ensure that AI systems adhere to ethical and legal standards for data privacy. • **Strengthen the foundational building blocks of cybersecurity**: Encryption, access control, and threat detection are essential for AI enablement as they safeguard data integrity and confidentiality. These measures ensure a secure environment for AI operations, preventing unauthorized access and cyber threats that could compromise AI systems.			
E3.6.1 Data Protection and Privacy Enforcement	• **Data Protection Regulations:** Develop and enforce clear data protection guidelines to safeguard personal data and uphold privacy rights in AI applications. This includes creating transparent rules for data handling, ensuring consent for data use, and protecting sensitive information. • **Privacy Rights Enforcement:** Strengthen mechanisms for enforcing privacy rights and ensuring compliance with data protection regulations. This involves conducting regular audits to ensure compliance, and imposing penalties for violations.	**Short-Term:** • Conduct a comprehensive review of existing data protection laws and regulations. • Develop draft guidelines for data collection, processing, and sharing in AI applications. • Initiate public consultations to gather feedback on proposed data protection regulations. **Medium-Term:** • Finalize and enact data protection regulations, incorporating feedback from public consultations. • Conduct training sessions and awareness campaigns to educate stakeholders about their rights and responsibilities under the new regulations. • Implement auditing mechanisms to monitor compliance with data protection laws, with a focus on protecting the privacy of vulnerable populations. **Long-Term:** • Evaluate the effectiveness of data protection regulations and enforcement mechanisms through periodic reviews and assessments. • Continuously update and adapt regulations to address emerging challenges and technological advancements in AI landscape. • Monitor international developments and best practices in data protection and privacy rights enforcement to inform ongoing improvements to national policies and regulations.	General measures of progress include: • **Development and Enforcement of Data Protection Guidelines:** Track progress in developing and enforcing data protection guidelines for AI applications, including transparent data handling rules, consent mechanisms, and regulations for sensitive data. • **Effectiveness of Privacy Rights Enforcement Mechanisms:** Monitor the number of enforcement actions taken against entities found to be in violation of data protection regulations, demonstrating the effectiveness of enforcement mechanisms. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)?	The French data protection agency, Commission Nationale Informatique & Libertés (CNIL), has provided guidance on how AI systems can ensure compliance with the French Data Protection Act and the General Data Protection Regulations (GDPR). To comply with the current legal standard, AI systems based on the use of personal data must always be developed, trained, and deployed with a clearly defined purpose (objective). The regulator had the opportunity to discuss the status of AI models under the GDPR with various organizations, and currently, it does not consider an AI model trained on personal data to necessarily contain personal data. However, it cautioned that there remain risks of privacy right breaches.[191]

[190] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[191] CNIL (2022), AI: ensuring GDPR compliance. Available at www.cnil.fr/en/ai-ensuring-gdpr-compliance

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[192]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**E3.7 Build Risk Mitigation and Monitoring Mechanisms for AI**			
Objective(s)	• **Develop Risk Mitigation Strategies:** Develop risk mitigation strategies to proactively mitigate potential risks and harms associated with AI technologies, enabling their responsible deployment across various sectors. • **Establish Monitoring and Evaluation Systems:** Implement regular monitoring and evaluation mechanisms for AI to bolster accountability and transparency in its deployment.			
E3.7.1 Develop and Implement Risk Mitigation Measures	• **Develop AI Risk Mitigation Strategies:** Establish comprehensive strategies to mitigate potential risks and harms associated with AI technologies, addressing issues such as bias, discrimination, and security vulnerabilities. These strategies should include proactive measures to identify, assess, and mitigate risks throughout the AI lifecycle • **Develop Bias and Fairness Mitigation Strategies:** Establish mechanisms and initiatives aimed at addressing bias issues and ensuring equitable outcomes in AI systems. This involves introducing measures such as algorithmic transparency, fairness-aware machine learning, and bias mitigation algorithms to minimize the impact of biased decision-making in AI applications.	**Short-Term:** • Conduct an initial assessment of potential risks and harms associated with AI technologies. • Begin the development of AI risk mitigation strategies by identifying key areas of concern such as bias, discrimination, and security vulnerabilities. • Initiate research and consultations with stakeholders to gather insights and inputs for developing bias and fairness mitigation strategies. **Medium-Term:** • Develop and finalize comprehensive AI risk mitigation strategies that address identified risks and harms. • Implement pilot programs to test the effectiveness of bias and fairness mitigation measures in AI systems. • Conduct training sessions and workshops to educate AI practitioners and developers on the importance of bias and fairness mitigation strategies. **Long-Term:** • Establish a framework for ongoing monitoring and evaluation of AI risk mitigation strategies, with mechanisms for regular updates and improvements. • Integrate bias and fairness mitigation mechanisms into AI development processes and industry standards. • Foster international collaboration and knowledge sharing on AI risk mitigation strategies to promote best practices and ensure global alignment	General measures of progress include: ***Risk Mitigation Strategies:*** • **Completion of risk mitigation framework**: Tracks the progress in developing a comprehensive framework to identify, assess, and mitigate risks associated with AI technologies, providing insight into the readiness of the strategy. • **Number of identified risks mitigated:** Quantifies the effectiveness of risk mitigation efforts by measuring the actual reduction of identified risks during various stages of AI development and deployment. • **Rate of successful implementation of risk mitigation measures:** Evaluates how efficiently proactive measures, such as bias detection algorithms and security protocols, are integrated into AI systems to address potential risks and vulnerabilities, indicating the level of preparedness in managing AI-related risks. ***Bias and Fairness Mitigation Strategies:*** • **Number of bias and fairness mitigation mechanisms established:** Reflects the extent to which measures like algorithmic transparency and bias mitigation algorithms are implemented to address bias issues and promote equitable outcomes in AI systems. • **Percentage increase in algorithmic transparency adoption:** Measures the growth in transparency practices within AI systems, highlighting progress towards more understandable and accountable AI decision-making processes. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q12. Is there a monitoring tool / mechanism / framework / organization in place to ensure that AI industry players (from both the public and	Indonesia has issued draft guidance for developers using AI to prevent potential misuse of the technology. The guidance is intended to mitigate all impacts and losses that may occur from the use of AI, and include recommendations on preparing a risk management strategy in the event of "AI disasters". The guidance also outlines reporting and recovery mechanisms that could be adhered to following such incidents.[193] As another form of a risk mitigation measure, the United States has secured voluntary commitments from leading AI companies, including Amazon, Anthropic, Google, Inflection, Meta, Microsoft, and OpenAI, to manage the risks posed by AI. These commitments include (a) ensuring products are safe before introducing them to the public, (b) building systems that put security first, and (c) earning the public trust.[194]

[192] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[193] Reuters (2023) Indonesia prepares ethics guidance for AI developers - draft, www.reuters.com/technology/indonesia-prepares-ethics-guidance-ai-developers-draft-2023-12-07
[194] The White House (2023) FACT SHEET: Biden-Harris Administration Secures Voluntary Commitments from Leading Artificial Intelligence Companies to Manage the Risks Posed by AI, FACT SHEET: Biden-Harris Administration Secures Voluntary Commitments from Leading Artificial Intelligence Companies to Manage the Risks Posed by AI | The White House

		in addressing AI-related risks and harms.	private sectors) effectively implement responsible AI measures? • Q30. Does the public/private sector have any AI risk mitigation strategies or processes that can mitigate potential/current risks and harms associated with AI technologies (either self-erected strategies or imposed by the national government)? • Q38. Does the public/private sector have any bias and fairness mitigation mechanisms or measures that address bias issues and ensure equitable outcomes in AI systems (either self-erected measures or imposed by the national government)?	
E3.7.2 Design and Leverage Risk Monitoring Measures	• **Implement AI Risk Assessment Processes:** Develop and implement standardized AI risk assessment processes or mechanisms, utilizing established frameworks like the ASEAN AI Risk Impact Assessment Template. This entails applying structured methodologies provided by the template to identify, assess, and prioritize risks throughout the AI lifecycle, ensuring thorough risk analysis and mitigation planning. • **Establish Continuous Monitoring and Evaluation Systems:** Establish continuous/regular monitoring and evaluation systems for AI systems in both public and private sectors. This includes monitoring the performance of AI systems, detecting and addressing any emerging issues or anomalies, and evaluating the impact of AI technologies on individuals and society. These systems should be equipped with mechanisms to track changes in AI systems over time and adapt to evolving risks and challenges. • **Implementation of Bias and Fairness Detection Mechanisms:** Implement bias and fairness detection mechanisms or measures, such as algorithmic auditing, to detect and mitigate bias in AI systems. This involves developing tools and techniques to identify bias in data	**Short-Term:** • Initiate capacity-building programs to train stakeholders in utilizing AI risk assessment methodologies and tools effectively. • Assess current AI systems to identify potential bias issues in data and algorithms, focusing on key sectors like healthcare and agriculture. **Medium-Term:** • Develop user-friendly guidelines for implementing AI risk assessment processes. • Conduct pilot AI risk assessments in select government departments or local businesses to identify initial risks and challenges and test the applicability of the AI risk assessment process. • Provide training sessions for local stakeholders on how to use bias-detection tools effectively, using local language and context-appropriate materials. **Long-Term:** • Extend the scope of AI risk assessments to additional government departments and local businesses, covering a more diverse range of applications and scenarios, thereby gathering more comprehensive insights into emerging risks and challenges. • Disseminate the user-friendly guidelines for AI risk assessment	General measures of progress include: • **Percentage of AI systems undergoing risk assessment:** Tracks the proportion of AI systems within public and private sectors that have undergone standardized risk assessment processes. This measure indicates the level of implementation and adoption of risk assessment mechanisms, contributing to the overall risk management framework. • **Rate of anomaly detection and response:** Measures the efficiency of continuous monitoring and evaluation systems in identifying anomalies or deviations from expected AI system behavior. This metric assesses the responsiveness of the monitoring mechanisms in detecting emerging issues and ensuring timely intervention to mitigate risks. • **Bias detection and mitigation success rate:** Evaluates the effectiveness of implemented bias and fairness detection mechanisms in identifying and mitigating biases in AI systems. This measure quantifies the proportion of identified biases that are successfully addressed, reflecting the performance of bias detection tools and mitigation strategies in ensuring fair and equitable AI outcomes. Achieving this milestone can increase AMS' score for the following questions in the benchmarking framework: • Q29. Does the public/private sector have any AI risk assessment processes or mechanisms such as AI impact assessments that can identify potential risks and harms associated with AI technologies (either self-erected measures or imposed by the national government)? • Q37. Does the public/private sector have any bias and fairness detection mechanisms or	Governments around the world are taking measures to monitor the risks associated with AI technologies. The federal government of Canada has created an Algorithmic Impact Assessment (AIA) tool to aid in implementing its Directive on Automated Decision-Making. This tool comprises a questionnaire that evaluates the impact level of automated decision systems, consisting of 48 risk-related and 33 mitigation-related queries. Evaluation scores are determined by various factors such as system design, algorithm complexity, decision types, impact assessment, and data considerations. Developed through consultation with internal and external stakeholders, including academia, civil society, and other public institutions, the AIA reflects best practices in algorithmic impact assessment. While primarily intended for governmental departments and agencies to better comprehend and mitigate risks associated with automated decision systems, it is publicly accessible for sharing and utilization under an open license. Additionally, its questionnaire can serve as a valuable resource for incorporating sound practices into AI risk assessment processes.[195]

[195] Government of Canada (2023) Algorithmic Impact Assessment Tool, www.canada.ca/en/government/system/digital-government/digital-government-innovations/responsible-use-ai/algorithmic-impact-assessment.html

	sets, algorithm design, and AI implementation processes. Additionally, measures should be taken to ensure the unbiased collection and processing of data, as well as the fair design and deployment of AI systems.	processes, ensuring wider accessibility and adoption across various sectors and organizations. • Expand the use of bias detection mechanisms to more AI projects in diverse sectors, gradually increasing the scope of coverage.	measures such as algorithmic auditing that detect bias and ensure unbiased data sets, algorithm design, and AI implementation (either self-erected measures or imposed by the national government)? • Q40. Is there any continuous/regular monitoring and evaluation of AI systems in the private/public sector that monitors the performance of AI systems, detects and addresses any emerging issues, and evaluates the impact of AI technologies on individuals and society?	In April 2024, the United States' National Institute of Standards and Technology (NIST) released a draft publication based on the AI Risk Management Framework (AI RMF) to help manage the risk of Generative AI. The draft AI RMF Generative AI Profile can help organizations identify unique risks posed by generative AI and proposes actions for generative AI risk management that best aligns with their goals and priorities. Developed over the past year and drawing on input from the NIST generative AI public working group of more than 2,500 members, the guidance centers on a list of 12 risks and more than 400 actions that developers can take to manage them.[196]

[196] NIST (2024) AI Risk Management Framework. AI Risk Management Framework | NIST

TARGETED PILLAR 4: STAKEHOLDER COORDINATION & REGIONAL COOPERATION ON AI

'ADVANCED' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[197]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A4.1 Strengthen the AI Start-Up Ecosystem**			
Objective(s)	• **Addressing Domain-Specific Challenges:** Specialized accelerator programs cater to the diverse needs of AI applications across industries, offering tailored support to overcome hurdles like data availability, regulatory compliance, and technical infrastructure. • **Lowering Barriers and Accelerating Growth:** Partnerships aimed at expanding access to resources like workspace, cloud computing credits, legal aid, and investor connections fill critical gaps for early-stage AI start-ups, empowering them to overcome initial hurdles and speed up their growth journey.			
A4.1.1 Strengthen the AI Start-Up Ecosystem	• **Expand Accelerator Programs:** Launch accelerator programs tailored to different AI domains and industries, offering targeted support and mentorship to address start-ups' specific needs and challenges. • **Expand Access to Resources:** Facilitate access to funding, facilities, and networks for AI start-ups through partnerships with investors and technology hubs. Provide resources like workspace, cloud computing credits, and legal support to lower barriers to entry and accelerate their growth.	**Short-Term:** • Identify key AI domains and industries with high potential for growth and innovation through consultations with industry experts, entrepreneurs, and investors. • Develop the structure and framework for accelerator programs, outlining key focus areas, mentorship opportunities, and networking events to support AI start-ups. • Initiate/continue discussions with venture capital firms, corporate investors, and technology hubs on funding and resources (business and technical expertise, infrastructure, and market networks) for AI start-ups participating in the accelerator programs. **Medium-Term:** • Roll out pilot accelerator programs in selected AI domains or industries, inviting start-ups to apply and participate in tailored support initiatives. • Establish/deepen partnerships with venture capital firms, corporate investors, and technology hubs to secure funding, business and technical expertise, access to infrastructure, industry networks, and expertise for AI start-ups enrolled in the accelerator programs. • Pair start-ups with experienced mentors and industry experts who can provide guidance, feedback, and connections to help them navigate challenges and accelerate growth. • Conduct regular assessments and surveys to measure the impact and effectiveness of the accelerator programs in supporting AI start-ups, gathering feedback for continuous improvement. Utilize insights from partners to refine and enhance program offerings. **Long-Term:**	General measures of progress include: • **Number of AI-enabled Start-ups and MSMEs:** Tracking the increase in the number of start-ups and MSMEs that have adopted AI technologies in their operations. • **AI Investment in Start-ups/MSMEs:** Measuring the amount of funding or investment directed towards AI initiatives and projects undertaken by start-ups and MSMEs. • **AI Start-up/MSME Growth:** Track the number of AI start-ups/MSMEs supported and their growth trajectory, including factors such as funding received, product development milestones achieved, and market penetration. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q23. Do businesses in the private sector develop, deploy, and adopt AI solutions?	The Norwegian government launched two initiatives to support AI start-ups companies. Innovation Norway is a state-owned company that gives Norwegian companies access to training, capital, and networks. For example, start-ups can receive advisory services on intellectual property rights, and connect with mentors for advice.[198] The organization also offers training to start-ups on business development and growth.[199] Investinor is a state-owned venture capital firm which provides venture capital to start-ups. The firm can make direct investments, invest in seed capital,

[197] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[198] Innovation Norway (2023), Start-ups, https://en.innovasjonnorge.no/article/start-ups
[199] *Ibid.*

		• Establish a dedicated AI resource center or hub where start-ups and MSMEs can access a wide range of resources, including cloud services, AI tools, and expert guidance. • Develop advanced training programs and certifications in AI for start-ups and MSMEs to further enhance their expertise and capabilities. • Implement sustained funding and investment support mechanisms, such as venture capital funds or innovation grants, to encourage continued AI adoption and innovation among start-ups and MSMEs. • Foster a vibrant ecosystem of collaboration and innovation by regularly hosting AI-focused events, conferences, and hackathons to bring together start-ups, MSMEs, investors, and industry experts.		venture funds, and match investments with private investors.[200]

[200] Investinor (2024), About Investinor, https://investinor.no/en/about-us

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[201]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**A4.2 Support and Promote Multi-Stakeholder Knowledge-Sharing**			
Objective(s)	• **Facilitate Knowledge Exchange:** Actively engage in international forums and collaborative initiatives, promoting knowledge sharing and contributing to the establishment of shared best practices in responsible AI adoption on a regional and global scale.			
A4.2.1 Advance and Support Multi-Stakeholder Knowledge Sharing	• **Enhance Interactive Knowledge Hubs:** Evolve existing knowledge-sharing forums into interactive hubs to facilitate deeper collaboration among stakeholders. Organize collaborative workshops focused on addressing specific AI challenges through co-creation. • **Contribute to Global Discourse on Responsible AI:** Host international summits and conferences to establish best practices and ethical frameworks for responsible AI. Develop and disseminate thought leadership publications to shape global AI governance strategies.	**Short-Term:** • Conduct a comprehensive assessment of existing knowledge-sharing platforms to identify areas for improvement and optimization. • Develop a roadmap for enhancing interactive features on knowledge-sharing forums, such as incorporating discussion boards, virtual collaboration tools, and project management functionalities. • Organize the first series of collaborative workshops with diverse regional and international stakeholders to address pressing AI challenges and co-create solutions. **Medium-Term:** • Implement enhancements to knowledge-sharing platforms based on the identified areas for improvement, ensuring usability and accessibility for all stakeholders. • Host regional workshops or seminars to gather insights and feedback from stakeholders on the effectiveness of interactive features and collaborative initiatives. • Plan and announce the schedule for hosting international summits and conferences on responsible AI, outlining topics and themes to be addressed. **Long-Term:** • Implement enhancements to knowledge-sharing platforms based on the identified areas for improvement, ensuring usability and accessibility for all stakeholders. • Host regional workshops or seminars to gather insights and feedback from stakeholders on the effectiveness of interactive features and collaborative initiatives. • Plan and announce the schedule for hosting international summits and conferences on responsible AI, outlining topics and themes to be addressed.	General measures of progress include: • **Thought Leadership Recognition:** Monitor the country's visibility and influence in global AI discourse through metrics such as the number of international conferences hosted, citations of thought leadership publications, and recognition in global rankings or assessments. • **Participation Metrics:** Measure the number of stakeholders actively engaged in knowledge-sharing activities, such as attending workshops, forums, and collaborative sessions.	The United Kingdom hosted the AI Safety Summit in November 2023, which brought together international governments, AI companies, civil society, and experts to discuss global safety issues associated with AI design, development, and deployment.[202] The Summit culminated several agreements on AI safety, including the Bletchley Declaration on AI Safety and a Joint Statement on AI Safety Testing. Additionally, countries also agreed to the publication of a State of Science report to build consensus on the risks of frontier AI.[203] To follow up on the Summit, the Korean government will host an interim virtual summit on AI to review the progress to date from different stakeholders. Another summit will be hosted in-person in France after the virtual meeting.[204]

[201] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[202] GOV.UK (2023), About the AI Safety Summit 2023, www.gov.uk/government/topical-events/ai-safety-summit-2023/about
[203] AI Safety Summit (2023), Home, www.aisafetysummit.gov.uk
[204] *Ibid.*

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[205]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**P4.3 Raise Public Awareness of AI Risks and Benefits for People, Communities, and Organizations**			
Objective(s)	• **Cultivate Public Understanding of AI:** Foster greater public awareness and understanding of AI risks and benefits, as well as ethical considerations to empower individuals to make informed decisions and engage meaningfully with AI technologies in their daily lives. • **Identify and Mitigate AI Risks for Vulnerable Populations:** Engage in targeted outreach initiatives to understand and address AI risks affecting vulnerable populations, aiming to identify and analyze potential challenges and develop tailored mitigation strategies.			
P4.3.1 Raise Public Awareness on AI Risks and Benefits	**Community Engagement and Capacity Building for Risk Mitigation:** Organize roadshows, social media campaigns, and public forums to educate citizens about AI technologies, their benefits, and potential risks. Collaborate with private companies, NGOs, and civil society organizations to demonstrate real-world applications of AI in widely used platforms, enhancing citizens' understanding of AI's role in their daily lives. Incorporate AI education into general education curricula to foster greater awareness and understanding of AI principles and ethical considerations.	**Short-Term:** • Plan and schedule the first round of roadshows, social media campaigns, and public forums to kickstart citizen engagement on AI. • Initiate discussions with private companies, NGOs, and civil society organizations to outline collaboration frameworks and identify suitable platforms for demonstrating AI applications. • Begin preliminary discussions with educational institutions to explore the feasibility of integrating AI education into the general education curriculum. **Medium-Term:** • Organize initial roadshows, social media campaigns, and public forums to introduce citizens to AI technologies and their potential benefits and risks. • Establish collaborations with private companies, NGOs, and civil society organizations to showcase practical AI applications on widely used platforms, enhancing public understanding. • Introduce AI education modules into selected general education curricula, with a focus on foundational principles and ethical considerations. **Long-Term:** • Expand community engagement efforts by conducting more roadshows, social media campaigns, and public forums across different regions. • Deepen collaborations with private companies, NGOs, and civil society organizations to demonstrate a wider range of AI applications and their impact on daily life.	General measures of progress include: • **Participation Rate:** Evaluate the number of citizens attending roadshows, social media campaigns, and public forums, indicating the level of engagement and interest in AI topics. • **Collaboration Agreements:** Assess the number of collaboration frameworks established with private companies and the identification of suitable platforms for demonstrating AI applications, reflecting progress in partnerships. • **Curriculum Integration:** Track the implementation of AI education modules in general education curriculum, measuring the coverage of AI principles and ethical considerations, and evaluating their effectiveness in enhancing citizen's understanding of AI and its related risks. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q9. Does the national AI coordinating body have any mechanisms or measures related to responsible AI? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	The Malaysian government, through MyDIGITAL Corporation, an agency under the Ministry of Digital, has launched the *Artificial Intelligence for Citizens* program (*AI Untuk Rakyat*) in collaboration with Intel.[206] The program is aimed at raising the literacy level of the public on AI, and therefore open opportunities to deepen technological knowledge that is essential in the digital world. It is an online self-learning program that has surpassed its one-year target of one million participants in less than six months since its launch in January 2024. In 2020, the Ministry of Education (MOE) of Korea released the Education Policy Direction and Core Tasks for the Artificial Intelligence.[207] The directives outline plans to roll out AI subjects in K-12 schools. Starting from 2021, the MOE gradually introduced AI subjects in elementary, middle and high schools. The curriculum includes subjects such as principles of AI, AI ethics, AI mathematics, software education, amongst others. The MOE expects that the AI curriculum to be fully

[205] The duration of short/medium/long-term is not specified as it may vary for each AMS. We will leave each AMS to determine the appropriate implementation timeframe, allowing for flexibility and adaptability to their specific dynamics and contexts.
[206] Malay Mail (2024) Rafizi: Govt launches AI Untuk Rakyat program to boost AI literacy among Malaysians. www.malaymail.com/news/malaysia/2024/01/16/rafizi-govt-launches-ai-untuk-rakyat-programme-to-boost-ai-literacy-among-malaysians/112684
[207] Asia Pacific Foundation of Canada (2021) Talent for the Future: AI Education for K-12 in Canda and South Korea, www.asiapacific.ca/sites/default/files/publication-pdf/AI%20K-12%20Education%20Report_FINAL.pdf

		• Fully integrate AI education into general education curricula nationwide, ensuring all students receive comprehensive exposure to AI principles and ethics.		adopted in all K-12 schools by 2025. To support the implementation of the AI education curriculum, the MOE works with the National University of Education and the Colleges of Education to provide AI courses to specialized teachers.[208] Apart from schools, the MOE and the National Lifelong Education Promotion Agency also made AI education programs available to the public through K-MOOC (Korea Massive Open Online Courses). Examples of courses on K-MOOC include basics of AI technology, data mining, and basics of AI technology.[209]
P4.3.2 Identify and Mitigate AI Risks for Vulnerable Populations	• **Conduct Targeted Outreach:** Initiate and conduct targeted outreach programs to engage with invisible/at-risk populations, aiming to understand challenges and risks specific these populations face. • **Risk Identification and Analysis:** Identify and analyze potential AI-related risks faced by vulnerable populations, taking into account their unique circumstances and vulnerabilities. • **Develop Tailored Mitigation Strategies:** Based on the insights gained from outreach and risk analysis, develop mitigation strategies to address the identified AI risks for vulnerable populations, ensuring their protection and well-being.	**Short-Term:** • Identify target communities and stakeholders for engagement. • Initiate outreach efforts to invisible/at-risk populations. • Gather qualitative data through interviews, surveys, and focus groups to understand the concerns and challenges faced by vulnerable populations regarding AI risks. • Begin brainstorming and initial discussions on potential mitigation approaches/frameworks based on early insights from outreach and risk identification efforts. **Medium-Term:** • Expand outreach efforts to reach a wider range of underserved communities, utilizing various communication channels and community-based organizations. • Analyze collected data to identify patterns, trends, and potential AI-related risks faced by vulnerable populations. • Develop detailed mitigation strategies tailored to address the identified AI risks for vulnerable populations.	General measures of progress include: • **Number of outreach/engagement programs launched:** Track the number of initiatives undertaken to engage with invisible/at-risk populations. Measure the number of individuals and communities reached through outreach programs, ensuring representation from diverse vulnerable populations. • **Identification of AI Risks and Challenges:** Evaluate the outcomes of initial assessments conducted to identify specific AI-related challenges faced by invisible/at-risk communities. • **Number of mitigation strategies developed:** Track the number of specific strategies proposed to address the identified AI risks for vulnerable populations. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q28. Does the public/private sector have any data governance and data sovereignty mechanisms or guidelines that include invisible/at-risk populations such as	The Department of Prime Minister and Cabinet in Australia released a study titled "How might Artificial Intelligence Affect the Trustworthiness of Public Service Delivery". Utilizing input gathered from surveys and workshops, the report aimed to comprehend the risks associated with employing AI in delivering public services.[210] Notably, workshops were held to delve into the perspectives of First Nations people. The report underscored the data concerns of First Nations people, particularly regarding the utilization of indigenous data in building AI systems and tools for public service delivery.[211] As such, the report recommended involving indigenous communities in the decision-making process,

[208] *Ibid.*
[209] *Ibid.*

[210] Australia Government, Department of the Prime Minister and Cabinet (2023), Australian Government Long-term Insights Briefings: How might Artificial Intelligence affect the Trustworthiness of Public Service Delivery, www.pmc.gov.au/sites/default/files/resource/download/ltib-report-how-might-ai-affect-trust-ps-delivery.pdf
[211] *Ibid.*

		• Collaborate with relevant stakeholders, including community representatives and experts, to develop targeted interventions addressing AI-related risks faced by vulnerable populations. **Long-Term:** • Pilot test selected mitigation strategies in real-world settings to assess their effectiveness and feasibility. • Monitor and evaluate the implementation process, gathering feedback from both stakeholders and affected communities. • Iterate and refine mitigation strategies based on ongoing evaluation and feedback loops. • Develop capacity-building initiatives to empower vulnerable populations with the knowledge and skills to mitigate AI risks independently. • Advocate for policy changes and institutional reforms to institutionalize the integration of AI risk mitigation measures into relevant frameworks and regulations.	marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-erected measures or imposed by the national government)? • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	particularly in relation to how their data is doing to be used or deployed in building AI solutions in the public sector.[212]

[212] *Ibid.*

'EMERGING' AI ECOSYSTEMS

Action Area	Target Area(s)	Proposed Milestone(s) and Tentative Timeframe[213]	Measure(s) of Progress	International Best Practices/Case Studies
Key Action Area	**E4.4 Develop and Maintain a Regional Repository of Use Cases on AI to Better Align/Improve National Approaches/Initiatives on AI Operationalization**			
Objective(s)	• **Curate and Document Use Cases:** Compile a comprehensive compendium of use cases highlighting how organizations across various sectors in ASEAN have implemented or aligned their AI governance practices with the ASEAN Guide on AI Governance and Ethics. This repository of use cases can provide insights into the practical application of responsible AI principles in different contexts and industries.			
E4.4.1 Contribute to a Regional Repository of Use Cases on AI	**Case Study Compilation:** Provide case studies on AI implementation from various sectors and industries in the country, highlighting both successful and unsuccessful experiences.	**Short-Term:** • Conduct an initial assessment of existing AI governance practices and case studies within the country. • Identify key stakeholders and organizations willing to contribute their AI case studies to the national repository. • Develop guidelines and templates for documenting and submitting AI case studies to ensure consistency and quality of contributions. **Medium-Term:** • Establish the national repository platform for hosting AI case studies, including features for easy navigation, search, and categorization. • Launch awareness campaigns and outreach initiatives to encourage organizations to share their AI case studies and highlight the benefits of contributing to the repository. • Host workshops and training sessions to provide guidance and support to organizations on how to document and submit their AI case studies effectively. **Long-Term:** • Continuously update and expand the national repository with new AI case studies from diverse sectors and industries within the country. • Foster collaboration and knowledge exchange among organizations through networking events, forums, and conferences centered around the national repository. • Evaluate the impact of the national repository on promoting responsible AI governance practices and fostering trust in AI technologies within the country.	General measures of progress include: • **Number of Case Studies:** Track the number of AI case studies documented and added to the repository over time, reflecting the breadth and depth of AI applications across various sectors. Achieving this milestone can increase AMS' score for the following question in the benchmarking framework: • Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	The Singapore government, through the Infocomm Media Development Authority (IMDA) and the Personal Data Protection Commission (PDPC), has issued a Compendium of Use Cases that showcases how diverse organizations, regardless of size or origin, have adopted or adjusted their AI governance approaches to align with the country's AI Model Framework. Additionally, the Compendium highlights how these organizations have successfully implemented accountable AI governance measures and reaped the benefits of AI integration into their operations.[214]

[213] The duration of short/medium/long-term is not specified as it may vary based on the pace of collaboration, policy implementation and reforms across the diverse AMS. This approach ensures flexibility and adaptability according to the dynamics and unique contexts of each AMS.
[214] Personal Data Protection Commission (2020) Compendium of Use Case: Practical Illustrations of the Model AI Governance Framework, www.pdpc.gov.sg/-/media/files/pdpc/pdf-files/resource-for-organisation/ai/sgaigovusecases.pdf

CONCLUSION & NEXT STEPS

This *ASEAN Responsible AI Roadmap (2025-2030)* seeks to complement and support the *ASEAN Guide on AI Governance and Ethics* and its key deliverables, in particular, the work of the ASEAN Working Group on AI Governance.

The Roadmap is thus envisioned to be a 'living document' that is periodically reviewed and enhanced as needed. In addition, it is important to note that the Roadmap is developed in consultation with ASEAN experts and stakeholders, and is intended to serve as a regional best practice guidance for ASEAN's ongoing work to build a fully integrated and interoperable AI ecosystem in the region.[215]

As such, it should not be interpreted or used to supersede or modify any legal obligations or rights of any party under the national laws of individual ASEAN Member States.

LOOKING AHEAD: IMPLEMENTING THE ROADMAP

This *ASEAN Responsible AI Roadmap (2025-2030)* is only the initial step in the path towards the operationalization of responsible AI in the region. Indeed, once the Roadmap is developed and endorsed, a most formidable challenge remains its effective and timely implementation.

The implementation of holistic plans and strategies is naturally riddled with institutional and organizational hurdles; from resistance to change to undefined objectives and priorities, a number of hurdles stand in the way of successful implementation.

These obstacles take on an entirely different dimension when it comes to implementing measures and initiatives specific to responsible AI. AI governance is continuously evolving, adding layers of complexity to an already complicated process. This requires organizations to be nimble, adaptable, and forward-thinking in their approaches to AI governance; a field that is so new and so rapidly evolving that many will find it difficult to stay abreast of global best practices.

In addition, AMS will be faced with the challenge of ensuring the implementation of the Roadmap is aligned with ongoing efforts and upcoming initiatives on digitalization and AI. Whether these are specific to ASEAN – the current *ASEAN Digital Masterplan 2025*, the current *ASEAN Guide on AI Governance and Ethics*, the upcoming *ASEAN Digital Economy Framework Agreement (DEFA)*, the upcoming *Guidelines on Responsible Development and Use of Generative AI in ASEAN* – or involve AMS through other multilateral organizations – the ongoing *UNESCO AI Readiness Assessment Model (RAM)*, the updated *OECD AI Principles* – AMS will need clarity and visibility on all simultaneous activities to avoid deduplicating efforts and resources.

NEXT STEPS

Access Partnership is ready to support ASEAN, its Member States, the ASEAN Working Group on AI Governance, and any other AI stakeholders from around the region to understand, navigate, and implement the various components of this *ASEAN Responsible AI Roadmap (2025-2030)*.

To this end, Access Partnership and DAI have started planning the various Roadmap implementation activities that will be conducted under the upcoming *ASEAN-USAID Partnership Program (AUPP)* (set to be launched in June-July 2024 until the end of 2029).

[215] Note: At the time of writing (mid-June 2024), Access Partnership has conducted and finalized a consultative workshop with ASEAN and ASEAN Secretariat stakeholders in Jakarta. This 1.5-day, in-person workshop took place on the sidelines of the 11th ASEAN Economic Community (AEC) Dialogue on the *ASEAN Guide on AI Ethics and Governance* and the *ASEAN Digital Economy Framework Agreement (DEFA)* negotiations.

Table 6 below presents the proposed activities that the Roadmap implementation will encompass (Note: these activities are presented here as a tentative schedule of priorities and are thus subject to change as the implementation is underway):

Table 6. Overview of proposed milestones/activities for the implementation of the *ASEAN Responsible AI Roadmap (2025-2030)* under the ASEAN-USAID Partnership Program (AUPP)

2024 *(Jul-Dec)*	Development of a concept note outlining a set of steps, activities, and milestones to support the implementation of the *ASEAN Responsible AI Roadmap 2025-2030* and the *Guidelines for Responsible Development and Use of Generative AI in ASEAN*.
2025	• Scoring of AMS using the self-assessment & benchmarking mechanism from the final *ASEAN Responsible AI Roadmap (2025-2030)*. • Development of a study on international best practices and case studies on implementation of responsible AI. • Leverage the findings of this study to support the creation of a Regional Repository of AI use cases. • A 2-day workshop aimed at socializing the findings of the self-assessment exercise and at aligning on the next steps for the implementation of the Roadmap (Day 1 with ASEAN sectoral bodies and representatives, Day 2 with Dialogue Partners).
2026	• Development of an economic impact analysis to quantify the potential benefits of responsible AI for AMS and ASEAN, with a focus on key sectors that AI can transform in priority. • Series of meetings to identify key priority Roadmap activities. • Leverage all findings to develop a tailored thematic Implementation Plan. This may include the development of a Guidebook on developing a (Responsible) AI National Strategy.
2027	• Leverage the self-assessment exercise and the UNESCO RAM findings to develop a preliminary report for each AMS to implement/advance the national/regional Roadmap activities. • Series of consultative meetings to socialize the draft country reports and obtain input on implementation needs, priorities, and challenges for each AMS.
2028	• Accompany and support AMS as they implement Roadmap activities. This may include supporting regional knowledge-sharing events and activities. • Conduct regular multi-stakeholder meetings and workshops to keep track of progress being made and to address barriers/challenges.
2029	• Develop a qualitative and quantitative assessment of the effectiveness and efficacy of Roadmap activities (identification of gaps and challenges to maximize the efficacy of future milestones). • Plan and conceptualize the activities supporting the continuity and sustainability of Roadmap activities beyond 2030. • Prepare a concept note with key priorities for the next iteration of the *ASEAN Responsible Ai Roadmap (2025-2030)*.

Source: Access Partnership and DAI

ANNEX. READINESS ASSESSMENT METHODOLOGY

BACKGROUND

Access Partnership has developed a self-assessment methodology to empower AI policymakers and regulators as they advance and prioritize responsible AI in their country's digitalization agendas. The methodology captures the key elements that these groups need to track their journey toward making their countries' business and policy environments conducive for responsible AI to be prioritized and operationalized.[216]

The methodology serves as a constructive and non-normative diagnostic tool for governments and economies to benchmark the progress made against established responsibility cores (privacy, accountability, fairness, etc.), making it easier to identify gaps, barriers, areas for improvement, and strategic investment needs. It also helps ensure that guiding approaches and strategies are developed in line with countries' specific needs, priorities, expectations, and capabilities (whether these are cultural, financial, infrastructural, institutional, or organizational).

In short, the methodology aims to provide the knowledge and tools necessary to foster and support national and regional journeys toward fairer, sustainable, and more equitable access to the opportunities presented by the development and operationalization of responsible AI. To this end, the methodology is designed to support AI stakeholders and decision-makers achieve two distinct but interconnected objectives:

1. Create a policy and regulatory environment that allows responsible AI to be advanced and prioritized as a central part of broader digital ecosystems.
2. Operationalize responsible AI across society, government, and the economy at their own pace and in their own manner.

It is important to note that the methodology draws upon international principles, guidelines, standards, and best practices that have facilitated the growth of more mature AI markets. It is also largely aligned with foundational AI governance frameworks and agreements, including the provisions and priorities embodied by the *ASEAN Guide on AI Governance and Ethics*.

ASSESSMENT PILLARS

The assessment methodology consolidates the fundamental building blocks that make a country's socioeconomic environment conducive to responsible and sustainable AI development. These building blocks are categorized under four main pillars that enable a favorable ecosystem for responsible AI practices and initiatives to emerge.

The four pillars are:

- **Assessment Pillar 1 – Internal Governance Structures and Measures**: All national AI laws, policies, and regulations, including AI-enabling measures and AI-adjacent initiatives, that enable the rise of data- and algorithm-driven technologies. This encompasses the formation of national bodies/agencies devoted to the enablement and operationalization of AI in general.

- **Assessment Pillar 2 – Human Centricity and Involvement**: Principles, guidelines, and standards that ensure AI is developed and leveraged in a fair, ethical, unbiased, inclusive, and sustainable manner; i.e., all mechanisms designed to ensure AI development and use are responsible.

[216] The RARI is available for download as a standalone report at https://accesspartnership.com/responsible-ai-readiness-index-rari

- **Assessment Pillar 3 – Risks and Operations Management**: The entrepreneurial and educational environment that equips the labor force with the skills, capabilities, and knowledge to develop and deploy AI responsibly, enabling investment and innovation around the responsible use of AI.
- **Assessment Pillar 4 – Stakeholder Interaction and Communication**: The wide range of stakeholders and organizations, including the private sector, academics, non-governmental organizations (NGOs), civil society organizations (CSOs), and not-for-profits, that contribute to mitigating risks and biases and minimizing harm from AI.

Together, these pillars provide an accurate overview of where AI ecosystems stand in terms of defined priorities, declared capabilities, and observed outcomes. A more detailed rationale for each pillar is set out in Annex Table 1 below:

Annex Table 1. Description and rationale of assessment pillars for responsible AI readiness

ASSESSMENT PILLAR 1 – INTERNAL GOVERNANCE STRUCTURES AND MEASURES
National AI policies/strategies/regulations are vital in an AI ecosystem as they establish the guardrails within which an ecosystem for ethical and responsible development, deployment, and use of AI technologies can emerge. As such, they define the roles and responsibilities of government agencies and outline all the necessary information required to get things done (mandates, resources, milestones, roadmaps, Key Performance Indicators (KPIs), etc.). They also facilitate international cooperation and harmonization and provide a supportive environment for the sustainable growth and adoption of AI. These frameworks can address issues such as fairness, privacy, accountability, and safety, providing a foundation for fostering public trust, promoting innovation, safeguarding individual and group rights, and addressing the potential risks and challenges associated with AI.
ASSESSMENT PILLAR 2 – HUMAN CENTRICITY AND INVOLVEMENT
Complementary to national policies, responsible principles, standards, and guidelines play a vital role in enabling fair and responsible AI. They serve as a framework to ensure alignment with ethical values and respect for human rights, fostering safety, transparency, trust, and public acceptance. By addressing biases, safeguarding privacy, and promoting safety, these principles establish a solid foundation for the development and deployment of AI technologies that are reliable, equitable, and uphold individual rights. Furthermore, they facilitate international collaboration and promote the responsible adoption and utilization of AI, maximizing the benefits of AI while effectively mitigating its risks and challenges.
ASSESSMENT PILLAR 3 – RISKS AND OPERATIONS MANAGEMENT
The private sector, academia, and civil society are key players in the social fabric, propelling AI investment and fostering innovation to enable the responsible use of AI. Businesses are at the forefront of AI development and implementation, while academic institutions and civil society possess specialized expertise, research capabilities, and perspectives to drive research and development. The collective expertise and knowledge from businesses, academia, and civil society can shape AI-related policies and regulations, particularly the responsible development of AI in the ecosystem. Their input helps ensure that policy decisions are informed, balanced, and aligned with the evolving needs of AI development, deployment, and ethical considerations based on the country's unique context. These stakeholders collectively deepen a country's AI capabilities, from implementation capability to talent development and policy development, creating a robust AI ecosystem that drives responsible and impactful progress. Therefore, ensuring that appropriate AI skill development happens across all these stakeholder groups is critical to the sustainable and responsible growth of AI economies.
ASSESSMENT PILLAR 4 – STAKEHOLDER INTERACTION AND COMMUNICATION
Aside from responsible AI principles, there is a need for a wide range of experts, stakeholders, and organizations, including academics, non-governmental organizations (NGOs), civil society organizations (CSOs), and not-for-profit organizations, to actively ensure that AI does not cause harm (both anticipated and unforeseen) or leave anyone behind. AI risk and bias management mechanisms thus play a vital role in mitigating potential harm and ensuring the fairness and non-discrimination of AI systems. By identifying and addressing biases and managing risks, they foster transparency, trust, and compliance with legal and ethical obligations. They also help educate the greater public on AI's potential. These mechanisms are indispensable in promoting responsible and accountable AI practices that align with societal values and deliver beneficial outcomes for individuals and society at large.

Source: Access Partnership

ASSESSMENT CRITERIA

Each Pillar contains 10 criteria through which to assess where countries and economies stand in building environments and ecosystems that promote the emergence of responsible AI. Annex Table 2 below lists all 40 criteria, providing the rationale and the assumptions that led to their formulation.

Annex Table 2. Description of assessment criteria for responsible AI

ASSESSMENT PILLAR 1 – INTERNAL GOVERNANCE STRUCTURES AND MEASURES	
CRITERIA	**DESCRIPTION**
Q1. Is there a national AI policy/strategy/law/regulation/framework in place?	The presence or absence of a national AI policy/framework/strategy offers a first glimpse of how advanced its AI ecosystem is. Having a national AI policy/framework/strategy indicates that AI has been at the top of the country's digital agenda. It serves as a crucial indicator of a country's preparedness and dedication to fostering a thriving AI ecosystem.
Q2. Does the national AI policy have clear objectives, milestones, roadmap, roles, and responsibilities so that it can be effectively implemented?	Having a national AI policy is not enough. A more important consideration surfaced from our interviews is how effectively the national AI policy can be implemented. As it would be subjective to assess the degree of effectiveness, we have listed key factors that enable effective implementation, such as having clear objectives, milestones, roadmap, roles, and responsibilities that we can objectively evaluate and assess.
Q3. Is there a national AI body tasked with coordinating national AI priorities and goals?	While some countries have multiple government agencies driving the AI agenda, they have no single body/agency coordinating the national AI efforts. This often results in duplicated and uncoordinated efforts and poor implementation. A national AI body that addresses AI-related matters and enables a coordinated approach and strategic plan can drive greater effectiveness and efficiency of AI initiatives through coordinated policy and regulation development, cross-sector collaboration, resource allocation, talent development, international collaboration, and public trust and engagement.
Q4. Does the national AI agency/existing agency have a clear mandate, bureaucratic legitimacy, and allocated budget to do its job effectively?	The mere existence of a national AI agency/existing agency is not enough. We need to consider the effectiveness of the agency through objective criteria, such as whether it has a clear mandate, bureaucratic legitimacy, and allocated budget to do its job effectively.
Q5. Does the national AI agency/existing agency engage with AI industry players to spread awareness of planned or existing national AI measures (policies, strategies, laws, regulations, etc.)?	Active engagement with AI industry players is crucial for fostering awareness, ensuring alignment among stakeholders and fostering a shared understanding of responsible AI practices/principles.
Q6. Are there any data governance/privacy laws and regulations in place that directly contradict other AI-enabling efforts?	From our desk research and interviews, the presence of contradictory data governance/privacy laws and regulations may stifle the responsible development of AI. We have included this question not just to identify enablers but also to assess the presence of disabling/contradictory policies in the ecosystem.
Q7. Does the national AI policy contain (explicitly or in spirit) a reference to ensure that AI has a positive impact on society (i.e., minimize harm inflicted)?	Among the several principles and themes in the AI policy sphere, we have identified "ethical" and "responsible" as the two most significant and relevant principles. However, some countries may have their own concept of "responsible AI." Words like "responsible" and "ethical" may not be directly present in the text of the country's AI framework but may be present in other forms of phrasing. Thus, we have included both explicit and nuanced references to ethical and responsible AI in this question to assess if the national AI policies contain any form of reference to ensure that AI has a positive impact on society.
Q8. Does the national AI policy contain measures that enable the development and deployment of responsible AI?	Beyond literal references to responsible AI, this question assesses if the national AI policy contains any policy measures that enable responsible AI (e.g., establishing AI ethics boards/organizations and rolling out data governance policies that emphasize responsible data collection, usage, and sharing).
Q9. Does the national AI coordinating body have any mechanisms or measures related to responsible AI?	Building on the previous questions, this question examines if the national AI agency (or coordinating body) has any mechanisms/measures related to responsible AI, such as publishing guidelines on responsible AI implementation for specific sectors and AI impact assessments to help AI developers measure their systems in an objective, responsible, and verifiable manner.
Q10. Is responsible AI listed as one of the priorities of the national AI coordinating body?	This question assesses whether responsible AI is listed as an explicit priority of the national AI coordinating body, which reveals whether responsible AI is at the top of the body's agenda.

ASSESSMENT PILLAR 2 – HUMAN CENTRICITY AND INVOLVEMENT	
CRITERIA	**DESCRIPTION**
Q11. Is the country a signatory to international or multilateral agreements on AI ethics, principles, or standards (e.g., the UNESCO Recommendation on the Ethics of Artificial Intelligence, the OECD Principles on AI, the G20 AI Principles)?	Multilateral guidelines, such as the UNESCO AI principles, may be more widely relevant or useful to governments compared to regional- or country-specific regulatory approaches. International/multilateral agreements can indeed be used as a checklist for governments' AI developments and implementation.
Q12. Is there a monitoring tool/mechanism/framework/organization in place to ensure that AI industry players (from both the public and private sectors) effectively implement responsible AI measures?	Stakeholders from our consultative workshop highlighted the need for a monitoring tool/mechanism/framework/organization to ensure that AI developers comply with responsible AI measures. Such monitoring is crucial to reinforce accountability, mitigate potential risks, and ensure the responsible deployment and implementation of AI across various sectors.
Q13. Does the AI industry association have a responsible AI framework and/or guidelines?	Similar to the question above, these questions assess whether other key players, such as an AI industry association or businesses from the private sector, have responsible AI framework/guidelines and implement any responsible AI measures. This provides us with an indicative cross-cutting perspective on whether the key stakeholders in the AI ecosystem prioritize responsible AI.
Q14. Do businesses in the private sector have any responsible AI principles/guidelines (developed within their own organizations or referenced from other organizations/government bodies) to guide the development and deployment of AI products/solutions?	
Q15. Do businesses in the private sector implement any responsible AI principles/guidelines in their development and deployment of AI products/solutions?	
Q16. Does the public/private sector have any environment-related guidelines or mechanisms that guide AI's impact on the environment/climate change (either self-imposed measures or enforced by the national government)?	Several interviews highlighted that the impact of AI on the environment has been actively discussed or incorporated into national AI policies.
Q17. Does the public/private sector have any policy guidelines or principles that outline the need for AI developments to protect/not harm human rights (either self-imposed measures or enforced by the national government)?	Our desk research demonstrated that AI has the potential to impact human rights, such as privacy, freedom of expression, and non-discrimination. Thus, there is a need to emphasize the protection and non-harm of human rights in AI developments, particularly for vulnerable populations.
Q18. Does the public/private sector have any guidelines or principles that outline the need for explainability and interpretability of AI systems (either self-imposed measures or enforced by the national government)?	Based on our desk research, a key component of reducing AI risk is to have AI systems that are transparent, explainable, and understandable for humans to trust and verify the system's outcomes.
Q19. Does the public/private sector have any policy guidelines or principles that highlight the need for human oversight in AI deployment and development to ensure human control, decision-making, and accountability in AI systems (either self-imposed measures or enforced by the national government)?	Our desk research has revealed that human oversight in AI deployment is important for ensuring that AI systems operate within defined boundaries and adhere to legal and ethical standards. That said, we recognize that human oversight may not be the best practice 100% of the time, as certain AI systems designed for specific tasks may demonstrate superior performance and reliability when functioning autonomously or with limited human intervention.[217] This is pertinent given the rise of AI technologies used in high-risk activities/applications (e.g., autonomous weapons) and in assisting human decision-making on issues directly affecting human life (e.g., self-driving cars, AI-assisted judicial decisions), which can have a long-lasting impact on someone's life and livelihood. Thus, we have included questions that assess if key human oversight guidelines or principles are established at both the general AI deployment level, as well as in the specific context of AI used in high-risk activities and on issues directly impacting human life.
Q20. Does the public/private sector have any policy guidelines or principles that govern the use of AI technologies in assisting human decision-making on issues directly affecting human life (e.g., autonomous weapons, self-driving cars, AI-assisted judicial decisions) (either self-imposed measures or enforced by the national government)?	

ASSESSMENT PILLAR 3 – RISKS AND OPERATIONS MANAGEMENT	
CRITERIA	**DESCRIPTION**

[217] Ben Green (2022) The flaws of policies requiring human oversight of government algorithms, www.sciencedirect.com/science/article/pii/S0267364922000292

Q21. Do the public and private sectors have the infrastructure to develop, deploy, and adopt AI solutions?	Aside from having government policies and responsible AI frameworks, we need to examine if the public and private sectors have the infrastructure and capability to develop, deploy, and adopt AI solutions.
Q22. Does the government develop, deploy, and adopt AI solutions to enhance the delivery of public services?	
Q23. Do businesses in the private sector develop, deploy, and adopt AI solutions?	
Q24. Is there sufficient AI talent to meet the manpower demands of the private sector?	A common theme across our interviews with AI experts and stakeholders has been talent/human capital development in AI-related skills through education and training to meet the growing demands of the private sector. Thus, we have included questions at all levels (AI education in universities, AI talent and training in the private sector and civil society) to assess the readiness of the workforce to adopt and deploy AI in a responsible manner.
Q25. Do universities offer undergraduate/graduate/postgraduate courses on AI, and specifically, on a responsible approach to AI?	
Q26. Is there a designated testbed/sandbox facilitated by the government for AI industry players to test AI regulations, policies, and applications, in a way that minimizes and mitigates the potential risks associated with AI?	Stakeholders from our consultative workshop highlighted the need for the government to provide a controlled test environment (i.e., testbed/sandbox) for AI industry players to experiment with AI regulations and applications. The testbed/sandbox aims to reduce the risks associated with AI and ensure that AI innovations comply with regulations before widespread deployment and adoption, fostering safer and more accountable AI development.
Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-erected measures or imposed by the national government)?	Some interviewees highlighted the need for adequate data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use.
Q28. Does the public/private sector have any data governance and data sovereignty[218] mechanisms or guidelines that include invisible/at-risk populations, such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-erected measures or imposed by the national government)?	An emerging theme from our interviews has been the lack of discourse on AI's impact on invisible/at-risk populations, such as indigenous and minority communities, and the lack of inclusion of indigenous/minority data governance and data sovereignty in AI policies/strategies. In this regard, indigenous communities risk being marginalized even further unless there is a concerted effort to empower them. Thus, we have included questions, including Q39 below, on mechanisms or guidelines on the need for diverse and representative data collection, data governance, and data sovereignty mechanisms for all "at-risk" populations.
Q29. Does the public/private sector have any AI risk assessment processes or mechanisms, such as AI impact assessments, that can identify potential risks and harms associated with AI technologies (either self-imposed measures or enforced by the national government)?	Several interviews highlighted the need for risk assessment mechanisms to identify, mitigate, and regularly monitor for potential AI risks and harms, as many ethical, legal, and societal implications remain regarding AI use. While these questions bear similarities with Q25 and Q26 above, Q32-34 are scoped at a broader level to assess if the public/private sector has any AI risk assessment mechanisms to identify and mitigate the intentional misuse of AI models/systems (e.g., using AI to create fake identities, assist in fraud activities, and launch targeted cyberattacks on vulnerable individuals/systems), rather than the granular level of algorithmic auditing of biases.
Q30. Does the public/private sector have any AI risk mitigation strategies or processes that can mitigate potential/current risks and harms associated with AI technologies (either self-imposed strategies or enforced by the national government)?	

ASSESSMENT PILLAR 4 – STAKEHOLDER INTERACTION AND COMMUNICATION	
CRITERIA	**DESCRIPTION**
Q31. Do NGOs, CSOs, and other citizen organizations provide skilling, reskilling, or upskilling training opportunities for employees in AI-related skills, and specifically, in responsible AI implementation/deployment?	A common theme across our interviews with AI experts and stakeholders has been talent/human capital development in AI-related skills through education and training to meet the growing demands of the private sector. Thus, we have included questions at all levels (AI education in universities, AI talent and training in the private sector and civil society) to assess the readiness of the workforce to adopt and deploy AI in a responsible manner.
Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations, collaborate on AI-related	We have learned from some interviews that collaboration on AI is at times limited to specific stakeholders, such as industry players and civil society, as government bodies do not always understand the nuances of AI operationalization.

[218] Data sovereignty refers to the idea that a country or jurisdiction has the authority and right to govern and control the data generated within its borders. Imperva (2023) Data Sovereignty, www.imperva.com/learn/data-security/data-sovereignty/

initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	However, based on our desk research, collaboration between key stakeholders, including policymakers, researchers, industry representatives, and civil society organizations, is crucial in achieving a balanced and representative discourse on AI's impact on society and people, as well as developing a holistic impact assessment, driving research and innovation, and ensuring the effective implementation of AI policies and initiatives.
Q33. Are NGOs, CSOs, and other citizen organizations involved in research and development activities in AI?	
Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies/frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)?	Our desk research shows that NGOs, CSOs, and other citizen organizations are essential to bringing diverse perspectives and ethical considerations to the table, ensuring that AI development considers societal impact and addresses concerns related to fairness, privacy, and bias. In addition, as civil society organizations represent the interests of the public, they can advocate for inclusivity, equity, and the protection of individual rights in AI use. Their participation promotes accountability and transparency and informs public discourse on AI-related policies and issues.
Q35. Is there an AI industry association that oversees AI development?	Based on our desk research, AI industry associations play a significant role in representing and advocating for the interests of the AI industry. They also play multi-faceted roles, including (i) facilitating knowledge sharing and collaboration, (ii) fostering public-private partnerships, (iii) contributing to the discussions and development of AI policies, standards, and ethics, (iv) supporting talent development and education, (v) driving industry research and innovation, and (vi) promoting international collaboration. Thus, we have included the presence of an AI industry association as a positive indicator of a thriving AI ecosystem as it contributes to the growth, competitiveness, and responsible development of the AI ecosystem.
Q36. Does the AI industry association implement responsible AI measures?	Similar to the question above, these questions assess whether other key players, such as an AI industry association or businesses from the private sector, have responsible AI framework/guidelines and implement any responsible AI measures. This provides us with an indicative cross-cutting perspective on whether the key stakeholders in the AI ecosystem prioritize responsible AI.
Q37. Does the public/private sector have any bias and fairness detection mechanisms or measures, such as algorithmic auditing, that detect bias and ensure unbiased data sets, algorithm design, and AI implementation (either self-erected measures or imposed by the national government)?	A common theme from our interviews with AI experts and stakeholders is the need to have mechanisms that can identify and mitigate the risks of AI to ensure that AI systems are fair, unbiased, and non-discriminatory.
Q38. Does the public/private sector have any bias and fairness mitigation mechanisms or measures that address bias issues and ensure equitable outcomes in AI systems (either self-erected measures or imposed by the national government)?	
Q39. Does the public/private sector have any non-discrimination and fairness mechanisms or guidelines that outline the need for diverse and representative data collection, including data from invisible/at-risk populations, such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-erected measures or imposed by the national government)?	An emerging theme from our interviews has been the lack of discourse on AI's impact on invisible/at-risk populations, such as indigenous and minority communities, and the lack of inclusion of indigenous/minority data governance and data sovereignty in AI policies/strategies. In this regard, indigenous communities risk being marginalized even further unless there is a concerted effort to empower them. Thus, we have included questions on mechanisms or guidelines on the need for diverse and representative data collection, data governance, and data sovereignty mechanisms for all "at-risk" populations.
Q40. Is there any continuous/regular monitoring and evaluation of AI systems in the private/public sector that assesses the performance of AI systems, detects and addresses any emerging issues, and evaluates the impact of AI technologies on individuals and society?	Several interviews highlighted the need for risk assessment mechanisms to identify, mitigate, and regularly monitor for potential AI risks and harms, as many ethical, legal, and societal implications remain regarding AI use. This question is scoped at a broader level to assess if the public/private sector has any AI risk assessment mechanisms to identify and mitigate the intentional misuse of AI models/systems (e.g., using AI to create fake identities, assist in fraud activities, and launch targeted cyberattacks on vulnerable individuals/systems), rather than the granular level of algorithmic auditing of biases.

Source: Access Partnership

SCORING MECHANISM

The scoring mechanism provides a quantitative measure of each of the 40 assessment criteria, allowing a total score to be derived for each of the four pillars. Annex Table 3 below provides more details on the scoring process and the assumptions behind it.

Annex Table 3. Detailed overview of scoring mechanism for responsible AI

ASSESSMENT PILLAR 1 – INTERNAL GOVERNANCE STRUCTURES AND MEASURES	
CRITERIA	**SCORING MECHANISM**
Q1. Is there a national AI policy/strategy/law/regulation/framework in place?	Yes = 3 points Announced/Upcoming = 1.5 points No = 0 points
Q2. Does the national AI policy have clear objectives, milestones, roadmap, roles, and responsibilities so that it can be effectively implemented?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q3. Is there a national AI body tasked with coordinating national AI priorities and goals?	Yes = 3 points Announced/Upcoming = 1.5 points No = 0 points
Q4. Does the national AI agency/existing agency have a clear mandate, bureaucratic legitimacy, and allocated budget to do its job effectively?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q5. Does the national AI agency/existing agency engage with AI industry players to spread awareness of planned or existing national AI measures (policies, strategies, laws, regulations, etc.)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q6. Are there any data governance/privacy laws and regulations in place that directly contradict other AI-enabling efforts?	Yes = 0 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 3 points
Q7. Does the national AI policy contain (explicitly or in spirit) a reference to ensure that AI has a positive impact on society (i.e., minimize harm inflicted)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q8. Does the national AI policy contain measures that enable the development and deployment of responsible AI?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming= 1.5 points No = 0 points
Q9. Does the national AI coordinating body have any mechanisms or measures related to responsible AI?	Yes = 3 points Announced/Upcoming = 1.5 points No = 0 points
Q10. Is responsible AI listed as one of the priorities of the national AI coordinating body?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
TOTAL PILLAR SCORE	**/ 30**

ASSESSMENT PILLAR 2 – HUMAN CENTRICITY AND INVOLVEMENT	
CRITERIA	**SCORING MECHANISM**
Q11. Is the country signatory to international or multilateral agreements on AI ethics, principles, or standards (e.g., the UNESCO Recommendation on the Ethics of Artificial Intelligence, the OECD Principles on AI, the G20 AI Principles)?	Yes (at least signatory to one) = 3 points Announced/Upcoming = 1.5 points No = 0 points
Q12. Is there a monitoring tool/mechanism/framework/organization in place to ensure that AI industry players (from both the public and private sectors) effectively implement responsible AI measures?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q13. Does the AI industry association have a responsible AI framework and/or guidelines?	Yes = 3 points Announced/Upcoming = 1.5 points No = 0 points
Q14. Do businesses in the private sector have any responsible AI principles/guidelines (developed within their own organizations or referenced from other organizations/government bodies) to guide the development and deployment of AI products/solutions?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q15. Do businesses in the private sector implement any responsible AI principles/guidelines in their development and deployment of AI products/solutions?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q16. Does the public/private sector have any environment-related guidelines or mechanisms that guide AI's impact on the environment/climate change (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q17. Does the public/private sector have any policy guidelines or principles that outline the need for AI developments to protect/not harm human rights (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q18. Does the public/private sector have any guidelines or principles that outline the need for explainability and interpretability of AI systems (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q19. Does the public/private sector have any policy guidelines or principles that highlight the need for human oversight in AI deployment and development to ensure human control, decision-making, and accountability in AI systems (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q20. Does the public/private sector have any policy guidelines or principles that govern the use of AI technologies in assisting human decision-making on issues directly affecting human life (e.g., autonomous weapons, self-driving cars, AI-assisted judicial decisions) (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
TOTAL PILLAR SCORE	**/ 30**

ASSESSMENT PILLAR 3 – RISKS AND OPERATIONS MANAGEMENT	
CRITERIA	**SCORING MECHANISM**
Q21. Do the public and private sectors have the infrastructure to develop, deploy, and adopt AI solutions?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q22. Does the government develop, deploy, and adopt AI solutions to enhance the delivery of public services?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q23. Do businesses in the private sector develop, deploy, and adopt AI solutions?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q24. Is there sufficient AI talent to meet the manpower demands in the private sector?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q25. Do universities offer undergraduate/graduate/postgraduate courses on AI, and specifically, on a responsible approach to AI?	Yes = 3 points Offers undergraduate/graduate/postgraduate courses on AI, but no specific courses on a responsible approach to AI = 1.5 points No = 0 points
Q26. Is there a designated testbed/sandbox facilitated by the government for AI industry players to test AI regulations, policies, and applications, in a way that minimizes and mitigates the potential risks associated with AI?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q27. Does the public/private sector have any data protection and data privacy measures to safeguard personal and sensitive information in AI data collection, storage, and use (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q28. Does the public/private sector have any data governance and data sovereignty[219] mechanisms or guidelines that include invisible/at-risk populations, such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q29. Does the public/private sector have any AI risk assessment processes or mechanisms, such as AI impact assessments, that can identify potential risks and harms associated with AI technologies (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q30. Does the public/private sector have any AI risk mitigation strategies or processes that can mitigate potential/current risks and harms associated with AI technologies (either self-imposed strategies or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
TOTAL PILLAR SCORE	**/ 30**

[219] Data sovereignty refers to the idea that a country or jurisdiction has the authority and right to govern and control the data generated within its borders. Imperva (2023) Data Sovereignty, www.imperva.com/learn/data-security/data-sovereignty/

ASSESSMENT PILLAR 4 – STAKEHOLDER INTERACTION AND COMMUNICATION	
CRITERIA	**SCORING MECHANISM**
Q31. Do NGOs, CSOs, and other citizen organizations provide skilling, reskilling, or upskilling training opportunities for employees in AI-related skills, and specifically, in responsible AI implementation/deployment?	Yes = 3 points Provides AI training opportunities but they are not specific to responsible AI = 1.5 points No = 0 points
Q32. Do stakeholders, including policymakers, researchers, industry representatives, and civil society organizations, collaborate on AI-related initiatives, including knowledge-sharing, research and development, development of AI ethics and principles, and innovation?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q33. Are NGOs, CSOs, and other citizen organizations involved in research and development activities in AI?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q34. Are businesses from the private sector, NGOs, CSOs, and other citizen organizations asked to contribute to AI-related policies/frameworks (i.e., are stakeholders from representative institutions invited to provide input on AI policies/frameworks)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q35. Is there an AI industry association that oversees AI development?	Yes = 3 points Announced/Upcoming = 1.5 points No = 0 points
Q36. Does the AI industry association implement responsible AI measures?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q37. Does the public/private sector have any bias and fairness detection mechanisms or measures, such as algorithmic auditing, that detect bias and ensure unbiased data sets, algorithm design, and AI implementation (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q38. Does the public/private sector have any bias and fairness mitigation mechanisms or measures that address bias issues and ensure equitable outcomes in AI systems (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
Q39. Does the public/private sector have any non-discrimination and fairness mechanisms or guidelines that outline the need for diverse and representative data collection, including data from invisible/at-risk populations, such as marginalized, underrepresented, and/or endangered indigenous communities, minorities, and the differently abled (either self-imposed measures or enforced by the national government)?	Yes = 3 points Inconclusive evidence of these elements through available source documents/Upcoming = 1.5 points No = 0 points
Q40. Is there any continuous/regular monitoring and evaluation of AI systems in the private/public sector that monitors the performance of AI systems, detects and addresses any emerging issues, and evaluates the impact of AI technologies on individuals and society?	Yes = 3 points Inconclusive evidence of these elements through available source documents = 1.5 points No = 0 points
TOTAL PILLAR SCORE	**/ 30**

Source: Access Partnership

READINESS TYPOLOGY

The score of each assessment criterion is summed up and tabulated into a Total Pillar score out of 30. This Pillar score allows a country's AI ecosystem to be categorized into one of three readiness tiers: Advanced, Promising, or Emerging.[220]

The description of each readiness tier is outlined in Annex Table 4 below:

Annex Table 4. Description of readiness tiers for the responsible and ethical operationalization of AI

[220] Note: The assessment methodology does not attribute weights to its Pillars, given the dynamic and multifaceted nature of driving and implementing responsible AI. Assigning weights risks oversimplifying the complex interplay of factors in an AI ecosystem. Instead, we have adopted a weight-neutral approach to capture a holistic evaluation, acknowledging that different contexts and stakeholders may prioritize different aspects of responsible AI.

	ASSESSMENT PILLAR 1 – INTERNAL GOVERNANCE STRUCTURES AND MEASURES	ASSESSMENT PILLAR 2 – HUMAN CENTRICITY AND INVOLVEMENT	ASSESSMENT PILLAR 3 – RISKS AND OPERATIONS MANAGEMENT	ASSESSMENT PILLAR 4 – STAKEHOLDER INTERACTION AND COMMUNICATION
ADVANCED *(21-30 points out of 30) **	Comprehensive governance frameworks and policies that ensure safe, ethical, and responsible AI usage. These frameworks encompass adaptive mechanisms to address new, emerging challenges.	Strong emphasis on human-centric AI, with bodies and mechanisms specifically tasked with ensuring AI respects human rights, benefits society, and leaves no one behind.	Robust risk management frameworks and operational measures that proactively identify, mitigate, and manage AI-related risks. This includes continuous monitoring processes and regular improvement of operational practices.	Transparent and inclusive communication channels foster trust and collaboration, enabling the active engagement of diverse stakeholders in the development and deployment of AI systems. This includes industry, academia, civil society, and government.
PROMISING *(11-20 points out of 30) **	Major AI governance mechanisms and structures are established, but they lack full coordination and consolidation. Strong efforts are made but are not yet fully sustained or comprehensive.	Key human-centricity principles and guidelines are in place, but not yet prioritized or operationalized at the highest levels. Where operationalization exists, efforts are not yet fully integrated or consistent across the ecosystem.	Risk management practices are in place but are not yet fully integrated or proactive. Operations management is improving but still faces challenges in effectiveness and consistency.	Interaction with stakeholders is present but their engagement is neither institutionalized nor systematic. Communication channels exist but are not yet fully optimized for proactive engagement.
EMERGING *(0-10 points out of 30) **	Basic governance frameworks exist and recognize the importance of responsible AI but lack comprehensive implementation. Significant foundational elements are still needed.	There is a high-level recognition of the importance of human-centered AI, but AI investment and innovation remains focused on productivity-driven AI applications, as opposed to more transformative, problem-solving use cases.	Basic risk management and operational measures exist but are often reactive rather than proactive. Significant improvements are needed to build a resilient and adaptive risk management system.	Stakeholder interaction and communication is limited due to budding communication networks and a limited pool of AI experts/professionals. Significant efforts are needed to grow the national AI ecosystem so that its voice is heard.

** The 40 assessment criteria are spread across the four assessment pillars (10 criteria per pillar). Given that each assessment criteria has a maximum score of 3 points, the possible score for each pillar is 30 points.*

Source: Access Partnership