



# Policy Guidance on Artificial Intelligence: Preserving Trust and Confidence in Artificial Intelligence to Promote Economic Growth and Social Development in Asian-Oceanian Region

## Document Purpose

This document has been prepared to provide guidance on issues and policy to ASOCIO members and other interested stakeholders on current and proposed approaches to enable greater development and use of artificial intelligence (AI) technologies with enhanced consumer trust and confidence. It can be used as a general background for both AI systems development by members of ASOCIO member associations and as a basis for discussions on policies affecting AI systems with government officials and policy influencers. Readers are encouraged to read ASOCIO's earlier [Policy Guidance on Data Privacy](#), and specifically directed to materials on the OECD's [AI Policy Observatory site](#).

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# Abstract

[Artificial Intelligence](#) (AI) — digital systems that can learn, reason, make decisions and act on their own to achieve design goals — has mixed perceptions because of the way it is sometimes presented as challenging human autonomy in negative ways. In contrast, mature AI systems have been safely used for many years with very positive effects — where AI includes ‘expert systems’ support medical diagnoses, ‘big data’ enables more accurate weather forecasting, ‘neural networks’ support the spell-checking of this document, and ‘machine intelligence’ guides us around traffic jams.

AI is evolving rapidly: as humans collaborate increasingly with machines, there is potential for fundamental economic and social transformations bringing with them significant new and existing market growth opportunities. The economic benefits arising are estimated to be equivalent to 14% additional global Gross Domestic Product (GDP) growth by 2030 — almost \$US16 trillion. Asia’s GDP will rise by between 5.6% and 10.4%, depending on the region. Positive social outcomes flow from economic growth and development through better healthcare, more accessible, individual learning opportunities, more effective resource allocation to avoid poverty and starvation including water conservation, among many.

Realising these benefits require existing and new technology companies in the ASOCIO region to engage with and seize the opportunities presented by AI. To facilitate this, governments must ensure they have a clear, national strategic framework for AI — covering both development and adoption. Key elements of a strategy include; investing and supporting research and development (R&D); enabling the digital infrastructure; building human capacity for both AI development and use, as well as preparing for labour market transformation; and cooperating internationally to facilitate trade and development.

Concurrent with national strategic planning and business development of AI systems, all stakeholders — especially government and industry — must ensure trust and confidence, the keystone of the networked digital age — is protected and kept front of mind. Systems must incorporate “good practices:” they must have effective governance and clear accountabilities; privacy must be maintained; data secured to preserve its integrity and confidentiality; and applications tested and audited to ensure outcomes reflect design objectives without biases.

Common, regional and global frameworks are central to ensuring trust and confidence in AI. Many nations and organisations have identified typical, now well-established elements of such frameworks, highlighted by the Organisation for Economic Cooperation and Development (OECD) in five key principles around “good practice” AI:

1. Openness, transparency and explainability, ie, transparent and responsible disclosure to people that they are dealing with AI, and what the AI system does;
2. Reliability and safety, ie, the AI system functions in a robust, secure and safe way in foreseeable use or misuse;
3. Privacy and security, ie, the AI system is designed and functions so as to respect the rule of law, human rights, democratic values and diversity;
4. Inclusiveness, ie, AI is developed and operates to benefit all people and the planet; and
5. Accountability, ie, those developing, deploying or operating AI are held accountable for their proper functioning.

ASOCIO urges all AI stakeholders — especially developers, those deploying AI, governments, system users and, indeed, consumers — to understand, advocate for and accept AI systems based on these principles. Adopting this approach will enable ASOCIO region economies to participate fully in the large economic and social opportunities enabled by AI with safety, security, trust and confidence.

# About ASOCIO

The Asian-Oceanian Computing Industry Organization (ASOCIO) is a grouping of IT industry associations representing economies in the Asia Pacific region. ASOCIO was established in 1984 with the objective to promote, encourage and foster relationships and trade among its members, and to develop the computing industry in the region.

Presently, ASOCIO represents 24 members from Australia, Bangladesh, Bhutan, Brunei, Cambodia, Hong Kong, India, Indonesia, Japan, Korea, Laos, Macau, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, and Vietnam. Today, ASOCIO's members represent more than 10,000 ICT companies and account for approximately US\$350 billion of ICT revenue in the region.

ASOCIO has established a Policy Task Force (ASOCIO-PTF) to promote a common understanding of “digital” related issues across the Region. The objective of the ASOCIO-PTF is to collaboratively research, develop, articulate and coordinate an ICT business voice on key issues affecting the sector to policymakers in APEC, ASEAN and South Asia economies. This paper is the second in a series developed and published by ASOCIO-PTF in pursuit of that objective.

## Our Audience (Who should read this Guidance)

This Guidance will be circulated widely to policymakers, business users, business partners, universities, all ASOCIO member associations and AI development and system companies, to raise awareness of issues associated with Artificial Intelligence (AI) technologies and ASOCIO’s acknowledgment of the importance of developing and deploying AI in ways that promote and enhance trust and confidence in digital technologies.

## What is “AI”?

In this paper, ASOCIO uses the general expression Artificial Intelligence, abbreviated as “AI”; Artificial Intelligence is frequently used interchangeably with a range of current digital processing technologies. Examples and applications in use include:

- Machine learning
  - Smartphone personal assistants such as Siri, Google Assistant and Alexa all incorporate this AI technology; they collect and refine the information on the basis of the user’s previous involvement with them. Subsequently, this set of data is employed to render results that are personalised to the user’s preferences.
- Deep learning
  - Examples include language translation applications such as Google Translate; chatbot support assistants; and “colourising” image processing that converts black-and-white images to colour.
- Expert systems
  - The most mature form of AI, expert systems uses knowledge stored in a knowledge base to solve problems that would usually require a human expert thus preserving a human expert’s knowledge in its knowledge base. There are many examples in medical technologies such as pathology and radiology systems to identify, for example, cancerous cells and bacteria types.
- Machine intelligence

- Smartphone navigation applications (Apple Maps, Google Maps, Waze) process traffic congestion patterns to predict journey times; Uber/Grab/Lyft further extend this to offer ride-share fare costs.
- Neural networks
  - Another mature AI technology, neural networks are the basis for applications such as the online spell checker, optical character recognition, image and speech recognition systems. These in turn underpin modern Natural Language Processing (NLP), exemplified by smart assistants (Siri, Google, Alexa) 'hearing', understanding and responding to the user's voice instructions.
- Automated decision-making
  - Credit scoring applications, plagiarism checkers, profilers and preference systems that suggest what you might like next (Amazon -- books; Netflix -- movies/videos).
- 'Smart' technologies
  - The Internet of Things is all about 'smart' technologies -- appliances that switch on/off based on patterns or sensor (eg, thermostat, moisture) information, smartwatches that incorporate heart rate monitoring, balance and GPS; refrigerators that create shopping lists as products are consumed.
- Big data
  - Weather forecasting is the classic, modern application of big data systems, where current sensor data is compared with historical data to predict weather conditions.

It is important to note that **all the technologies listed above are, as demonstrated by the application examples, in commercial implementation -- not experimental**. Thus, various artificial intelligence technologies are mature. Enhancements, derivations and new systems are constantly in development, and form the basis for future digital technologies.

Artificial Intelligence can be separated into Narrow and General AI:

- Narrow AI or Artificial Narrow Intelligence (ANI), also known as "Weak" AI, is AI that is programmed to perform a single task - such as checking the weather, playing chess, or analysing raw data to write journalistic reports. ANI systems can attend to a task in real-time, but they pull information from a specific data-set. As a result, these systems do not perform outside of the single task that they are designed to perform.
- General AI or Artificial General Intelligence (AGI), also known as "Strong" AI, closely mirrors human intelligence by being able to reason, solve problems, make judgements under uncertainty, plan, learn, integrate prior knowledge in decision-making and transfer learnings from one environment to another. In other words, AGI can successfully perform any intellectual task that a human being can.

A concise technical definition is that AI comprises fields of computer science, which seek to create machines and software ("systems") that can learn, reason, make decisions and act on their own to achieve their goals.

Whenever a machine completes tasks based on a set of stipulated rules that solve problems (algorithms), such an "intelligent" behavior is what is called AI.

An AI system comprises a machine learning (ML) subsystem; in turn, deep learning (DL) is a subset of machine learning. Other AI systems include NLP, Robotics, Knowledge Representation and Reasoning, Planning and Perception.

More practically, AI is a collective term covering a range of digital technologies that incorporate or take data from environmental and other sensors, analyse this data, learn based on programmed rules and developed scenarios, and respond to the sensor data in the context of system objectives. Based on this, [according to PWC](#) there are four forms of “AI”:

- *Automated intelligence*: Automation of manual/cognitive and routine/non-routine tasks.
- *Assisted intelligence*: Helping people to perform tasks faster and better.
- *Augmented intelligence*: Helping people to make better decisions.
- *Autonomous intelligence*: Automating decision making processes without human intervention.

If we think about those four forms of “AI”, it quickly becomes obvious that, as humans collaborate increasingly with machines, there is **potential for fundamental economic and social transformations** bringing with them significant new market and existing market growth opportunities.

## Artificial Intelligence Opportunities

As noted above, mature AIs are already applied in current digital technologies; **few areas of economic activity are untouched by their impact**, which is measured by **productivity gains** and **sectoral transformation**. Yet leading analysts suggest this is just the tip of the iceberg. Hence, one of ASOCIO’s aims with this paper is to highlight the opportunities for national development and to urge all stakeholders to develop strategies that enable gains to be maximised and captured while minimising adverse effects of transformational adjustments.

### 1. Economic Development

Earlier in 2019, consultants PwC completed an extensive study on the impact of AI – [Sizing the prize: PwC’s Global Artificial Intelligence Study: Exploiting the AI Revolution](#). This study analyses “economic potential for AI between now and 2030, including for regional economies and eight commercial sectors worldwide” and suggests that “*global GDP could be up to 14% higher in 2030 as a result of AI – the equivalent of an additional \$USD15.7 trillion – making it the biggest commercial opportunity in today’s fast changing economy*”. The report suggests the greatest gains will be in China (+26% boost in GDP by 2030 and North America (+14%); “developed” Asia (excluding China) can expect +10.4% GDP growth (almost \$USD 1 trillion) and the combined GDP of Africa, Oceania and other Asian markets is estimated to grow by 5.6% (\$USD1.2 trillion).

A 2018 study by consultants McKinsey & Company – [Notes from the AI frontier: Modeling the impact of AI on the world economy](#) – yields broadly similar results.

The PwC study says these GDP gains from AI will be driven by productivity gains from:

1. Businesses automating processes (including the use of robots and autonomous vehicles);
2. Businesses augmenting their existing labour force with AI technologies (assisted and augmented intelligence); and
3. Increased consumer demand resulting from the availability of personalised and/or higher-quality AI-enhanced products and services.

**Labour productivity improvements** are estimated to account for over 55% of all GDP gains; however, PwC suggests 58% of all GDP gains will come from consumption side effects, ie, market and market size growth.

**AI will positively impact all sectors**, but most especially elaborately transformed manufacturing and services. The World Intellectual Property Organisation has recently highlighted the [rapid growth in AI-based innovation](#), with rapid growth in patents filed, especially in fields such as transportation

Both PwC and McKinsey point to employment effects -- “*some job displacement – but also new employment opportunities*” (PwC) and “*a widening gap*” (McKinsey):

*“Job profiles characterized by repetitive activities or that require a low level of digital skills could experience the largest decline as a share of total employment to around 30 percent by 2030, from some 40 percent. The largest gain in share could be in nonrepetitive activities and those that require high digital skills, rising from roughly 40 percent to more than 50 percent”.* (McKinsey)

The evidence from PwC and McKinsey show that development and use of AI technologies will **yield large economic benefits** to those nations that enable and encourage adoption of AI. These benefits will extend broadly across national economies and will include positive employment effects where countries adapt rapidly to changing skill requirements.

## 2. Social Development

The [World Bank](#) highlights **key social development impacts**, including how:

- AI can analyze vast quantities of healthcare data, leading to scientific breakthroughs.
- AI can predict and identify optimal budget allocation for effective and cost-efficient interventions to achieve a government’s goal.
- AI can revolutionize classrooms by providing individual learning pathways and virtual mentors.
- AI can map poverty from space, enabling real-time resource allocation.
- AI can predict and identify optimal production levels to reduce waste.
- AI-based solutions make available Uber-like sharing of services for tractors and refrigeration, providing poorer farmers with access to the services that they need only at certain times of the year
- AI-powered climate modelling can help predict climate-related disasters.
- Pattern recognition can track the movement of fishing boats to combat illegal fishing.
- Sensors can predict consumption patterns for efficient and safe water provision.
- AI can drive more balanced hiring practices and spotlight gender inequality.

[Another study by the International Finance Corporation](#) (part of the World Bank Group) summarises the situation:

*“Traditional pathways to a country’s economic development are increasingly subject to technology-based disruptions. AI is highly disruptive in that it can result in a step change in the cost of or access to products or services, or can dramatically change how we gather information, make products, or interact. As development challenges become more and more intertwined with technology based disruptions, the twin goals of ending poverty and boosting shared prosperity become critically dependent on*

*harnessing the power of technologies such as AI, while at the same time seeking to limit the associated risks.”*

This evidence reiterates and reinforces the well-known process by which positive social outcomes flow from economic growth and development.

### 3. Business Development

ASOCIO members and ICT development businesses are already involved in AI development by, for example:

- Developing AI platforms such as facial and image recognition, autonomous vehicle systems, asset security surveillance, robotics, natural language processing (NLP), etc.
- Providing systems integration with AI tools like NLP chatbot customer support, big data analysis, quality monitoring and risk analysis to support health, logistics, manufacturing, transport among key sectors
- Aggregate Services like Robotics Process Automation, anomaly detection in financial transactions, predictive maintenance, geophysical feature analysis and recognition, pathology and medical imaging
- AI education and skills development including recurrent and extension training.

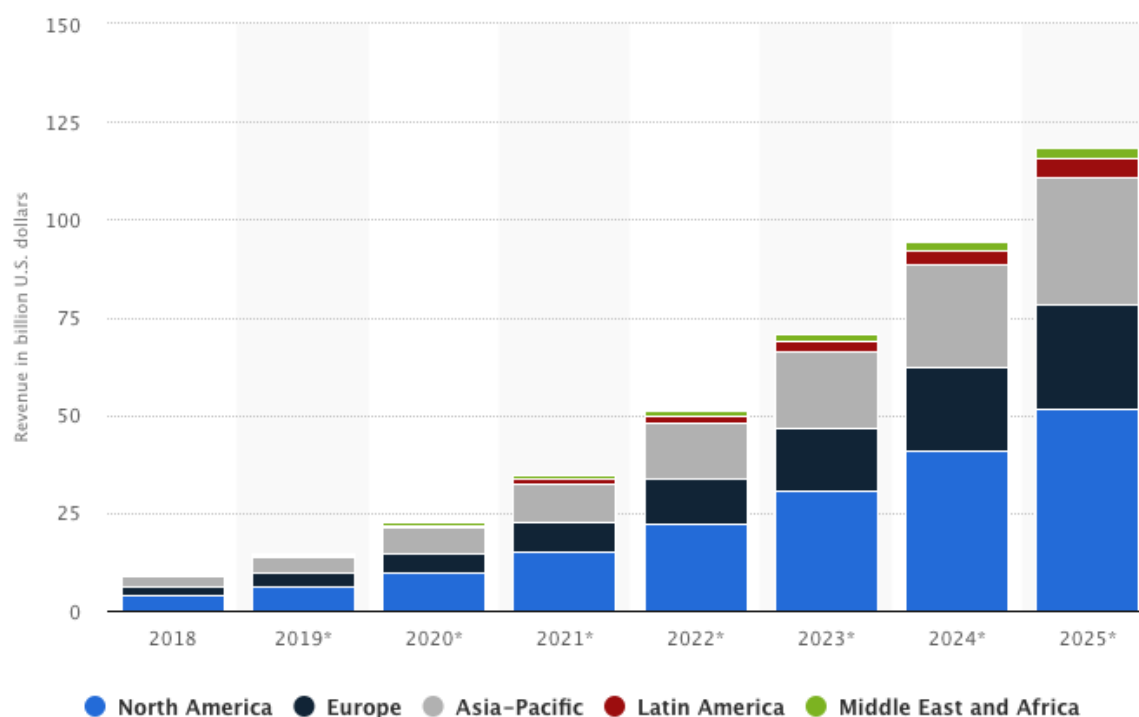
The **economic impact** of AI revealed above (PwC; McKinsey) indicates significant market creation and market size growth arising as AI technologies proliferate in both development and use. For the ASOCIO region and economies, this will largely be commercially driven, and means business growth opportunities for ICT businesses in all ASOCIO member nations. However, as discussed earlier and below, this depends on government strategies enabling a favourable business environment, enabled through broadband infrastructure, R&D support, skills development and public sector customer leadership, among key catalysts.

There are a number of **market forecasts** for the global market for AI products and services, all with different definitions, measures and coverage – hence differing dramatically:

- [Gartner](#) estimates AI-derived “business value” (ie, includes customer productivity gains) in 2019 to be \$US1.9 trillion and forecasts it will reach \$US3.9 trillion in 2022;
- [IDC](#) predicts “spending on cognitive and AI systems” will reach \$77.6B in 2022, more than three times the \$24.0B forecast for 2018; and
- [Statista](#) offers an estimate of global AI revenue to be at over US\$90 billion in 2025, with the biggest impact of AI on GDP is expected in China and India, while the biggest impact on labor productivity is expected in the Nordics.

Regardless of forecast methodology, all agree that **market growth rates will be very large**. Figure 1 (below) reflects Statista’s forecast methodology broken down by region. They suggest the **Asia-Pacific market** (encompassing most ASOCIO members) **will quickly outstrip Europe** to become the second largest regional market behind North America from 2020 onwards.

Figure 1: Revenues from the artificial intelligence software market worldwide from 2018 to 2025, by region (\$US Billion) (Appendix 1 provides full size chart)



© Statista 2019

Through its transformative role, **AI is thus an essential enabler of ICT business growth** in the economies and businesses of ASOCIO members, providing future business for system developers, integrators and customer-user businesses alike.

Together, the economic, social and business opportunities driven by AI adoption are significant and far-reaching. A central policy goal of all governments must be to achieve and secure these opportunities, while ensuring minimisation of any negative or unintended consequences. This can be realised by working cooperatively with other governments and regional intergovernmental organisations, and collaboratively with ICT developers, users and businesses generally to ensure that as AI systems proliferate, trust and confidence is maintained.

The remainder of this paper examines first, the importance of a national strategy to enable development, adoption and use of AI, secondly, the central importance within this strategy of building and preserving vital trust and confidence, and finally actions to prevent or respond to some of the adverse perceptions and unintended consequences of AIs.

## Country Action: Develop a National AI Strategy

ASOCIO concludes from this evidence that the development and deployment of AI technologies is overwhelmingly of benefit to economic and social development, as well as generating business opportunities for local technology companies.



Governments in the ASOCIO region should use this evidence to maintain and extend a business environment that enables and enhances AI technology development and adoption as a priority national strategy. A first step might be for governments to **assess national “readiness”** using, for example, a model such as that developed by [Oxford Insights](#), which scores the capability of governments according to their preparedness to use AI in the delivery of public services. While the public sector is by no means a full reflection of national capability, the revealed strengths and weaknesses highlight fundamental areas of focus for a national strategy. The model could be equally applied to assess other sectors, that is, manufacturing, financial services, health, retail, construction, transport etc.

The World Economic Forum (WEF) recently produced [A Framework for Developing a National Artificial Intelligence Strategy](#), which provides an excellent basis for planning. The WEF highlights four key areas of strategic focus:

1. *“Providing a set of standardized data-protection laws and addressing ethical concerns”*
2. *“Establishing a strong research environment and forging industry-academia integration”*
3. *“Preparing the workforce for the AI economy”*
4. *“Investing primarily in strategic sectors”*

The WEF cites multiple examples of national strategic frameworks for AI, including [Finland](#), [Germany](#), [Denmark](#), the [UK](#), [Canada](#), and even a small economy, [Malta](#).

The OECD has also undertaken considerable AI-related policy work and in 2019 highlighted relevant [“national policies and international co-operation for trustworthy AI”](#), which include:

- investing in **AI R&D**;
- fostering a **digital ecosystem**;
- creating an **enabling policy environment**;
- building **human capacity**;
- preparing for **labour market transformation**; and
- encouraging **international cooperation**.

Virtually all national strategies reflect common themes and include programs to:

- create an **open, transparent business regulatory environment** that highlights privacy and data protection through effective data security and governance practices (on this, see ASOCIO’s related [Policy Guidance Paper on Data Privacy](#));
- Underscore the **importance of ethics and embed them** in the development and application of AIs (see later);
- **identify key industries/sectors** of the national economy where AI-based transformations can have the greatest impact;
- **support fundamental and applied AI technology R&D** activities, including international collaboration;
- **build the national digital infrastructure** of broadband wired and wireless networks;
- ensure a **suitable and relevant skills base** through universities and colleges -- not just for graduates -- but also to upgrade existing workforce skills; and
- initiatives to **educate businesses and consumers** on the use and benefits of AI.

ASOCIO urges all readers of this policy guidance to review the strategy, policies and actions of their national governments, and to **advocate for the adoption of programs** such as those outlined in this section, in order to capture and secure the economic, social and business opportunities offered by development of, and growing use of, AI.

# National and Regional Priority: Ensure Trust and Confidence in AI Systems

From the outset of the networked digital age, **developing and maintaining trust and confidence in systems and processes has been of paramount importance**. This does not just apply to the output of a system, but also ensuring we, as citizens and consumers, know and understand the source of data used by a system, and how that data and the processing outcome based on it is subsequently treated. For example, we want assurance that a finance/credit decision is based on relevant, factual data, and that a purchase online reflects our actual choices and actions in selecting and paying, that diagnostic/treatment decisions on our health reflect accurate data gathered through pathology and other tests that are attributable to our identity and the identity/authenticity of the entity with which we are dealing. We want all of this to be permission-based, undertaken securely and to be assured the data we provided during this process maintains its integrity and is not used for anything that has not been disclosed to us, or to which we have not agreed.

**This transparent, traceable, secure, governed and permission-based approach has been the foundation upon which trust and confidence in digital systems has been established hitherto**; indeed, similar elements are hallmarks of the physical trust and confidence environment. Thus, ASOCIO emphasises the **paramount importance of continuing this approach** with respect to AI systems.

By their nature, Artificial Intelligence systems add complexity to trust and confidence. The combination of, for example, big data and machine learning means data affecting privacy may be derived as part of the process; that data may be incorrect (due to incorrect collection methods) but nevertheless applied, leading to a prejudicial output or decision, not just to an individual but groups or society generally. That this might occur is a mere possibility; it should not form the basis of a fearful paralysis; as with all technologies, a risk-based approach must be adopted to identify “good practices”, not pursue unattainable perfection, and to underscore the continuing importance of prototyping and testing, measuring and reviewing.

These “good practices” include:

- **Effective, “designed-in” security arrangements** that preserve the confidentiality and integrity of data -- especially personal information -- while enabling it to be available for processing [as permitted for privacy purposes](#) when the data was provided/collected;
- **Implementation control strategies and systems governance arrangements** that identify responsibility and accountabilities; and
- **Audit and outcome measurement processes** to review performance, quality and outcomes against objectives, and identify areas for performance improvement.

Nevertheless, establishing and maintaining trust and confidence in AI systems is even more critical. As occurred during the formative days of the public Internet, this entails identifying concerns and responses, documenting these, attaining global consensus on the “good practices”, and distributing these as widely as possible. Central to this is **expressing essential principles simply and clearly** to meet the needs of many stakeholders and audiences.

# Key Principles for Trust and Confidence in AI

ASOCIO notes that considerable work has been completed by organisations such as the [G20](#), the [OECD](#), the [EU](#), [Harvard](#), [Japan](#), [Singapore](#), [Australia](#), [Google](#), [Microsoft](#), and [IBM](#) among many.

Foremost among these, ASOCIO identifies and urges observance of, and adherence to, the “Principles for Responsible Stewardship of Trustworthy AI” and “Recommendations for National Policies and International Co-operation for Trustworthy AI” contained in the [OECD Legal Instrument adopting the Recommendation of the Council on Artificial Intelligence](#) (22 May 2019).

The OECD highlights five common principles set out below. These are also elements of most national and corporate statements of principle (linked above):

## 1. Openness, transparency and explainability.

- There should be **transparency and responsible disclosure** around AI systems to ensure that people understand AI-based outcomes and can challenge them. That is, information on AI systems that is meaningful, appropriate to the context, and consistent with the state of the art.
- This means people should be made aware of when they are interacting with AI, have some understanding of the outcome, and can challenge this based on plain, comprehensible information as to the input and logic leading to that outcome.

## 2. Reliability and safety

- AI systems must **function in a robust, secure and safe way** throughout their life cycles and potential risks should be continually assessed and managed. In the words of the OECD, this extends “...*throughout their entire lifecycle so that, in conditions of normal use, foreseeable use or misuse, or other adverse conditions, they function appropriately and do not pose unreasonable safety risk.*”
- Equally, processing through AI systems should be traceable throughout the system lifecycle

## 3. Privacy and security

- AI systems should be designed in a way that **respects the rule of law, human rights, democratic values and diversity**, and they should include appropriate safeguards in trust – for example, the protection of personal data, ensuring the security of data and network, enabling human intervention where necessary – to ensure a fair and just society
- To this end, the OECD recommends “*a systematic risk management approach to each phase of the AI system lifecycle on a continuous basis*” be applied

## 4. Inclusiveness

- AI should **benefit all people and the planet** by driving inclusive growth, sustainable development and well-being.

## 5. Accountability

- Organisations and individuals developing, deploying or operating AI systems should be **held accountable for their proper functioning** in line with the above principles.

ASOCIO urges all national stakeholder organisations with an interest in AI issues to reflect on and, appropriate to their situation, **adopt these principles as central to their policies for development and use of AI technologies**. To support this, Appendix 2 comprises an

interactive tool that enables AI development companies to understand and assess their current vs desired level of AI capability maturity using the above principles as guidance.

## A Regional Framework

To emphasise the importance of extending trust and confidence in AI as well as ensuring the economic and social benefits accrue widely, ASOCIO proposes that frameworks incorporating the principles above be adopted not just by national governments but also by multilateral regional organisations and NGOs -- [ASEAN](#), [APEC](#) and [EAF](#). Regional coordination and collaboration, especially on policy and regulatory frameworks, **reduces trading friction** and uncertainty due to disparate policy approaches and conflicting regulations. ASOCIO will work with these organisations and urges ASOCIO members and their governments to adopt and support the principles.

ASOCIO expects OECD’s “[AI Policy Observatory](#)” work will help coordinate many efforts regarding AI development and policy shaping. We appreciate any opportunity to exchange our experience and ideas to maximise the effective impact of AI on this region.

For its part, the AI industry through ASOCIO will develop tools to show how the principles can be incorporated in AI systems development. An example “checklist” for AI developers is included at Appendix 2.

## Artificial Intelligence: Other Issues

In preparing this paper, ASOCIO’s research revealed a group of eight discrete issues, which policy-makers and businesses alike need to consider and address specifically. These are issues that are more frequently expressed as “concerns” and “fears” about the adoption and impact of AI, and hence often presented as “barriers”. ASOCIO suggests the initiatives and actions outlined above -- the development of national AI strategies including specific principles to ensure trust and confidence -- largely address these effectively. Nevertheless, it is appropriate for this policy guidance to support its readers with more specific commentary.

The following table provides a summary of these together with ASOCIO’s suggested approach to resolve concerns.

Issue	Policy Options / Approaches
<p>1. <b>Basic and Applied Research</b></p> <p>Nations -- especially emerging economies -- may not have fundamental capability and competitiveness in technological development, and may fall behind.</p>	<p>Priority for national R&amp;D capability development and funding as part of national strategy.</p> <p>While such issues are usually addressed at the national level, ASOCIO suggests there are opportunities for regional cooperation and collaborative activities, for example, around IP sharing and collaboration with academia and public research, perhaps with coordination and assistance from regional intergovernmental organisations (ASEAN, APEC, EAF...) and the World Bank.</p>

## 2. The Future of Work: Talent Attraction, and Skills Development

Appropriate skills is a constant national competitiveness issue, often emerging as an imbalance of educational infrastructure/personnel capability, motivation/enthusiasm of children due to economic/social/cultural opportunity factors, and subsequently in “freedom of movement” issues, ie, between economies with a surfeit of talent to those with a scarcity, or “skill poaching”/economic migration issues based on earnings/lifestyle differences, hollowing out the skills base of the donor economy.

AI systems are widely perceived as threatening future jobs. Just as industrialisation hollowed out the precursor manual labour manufacturing workforce, there is concern AI systems will supplant “white collar”, “back-office” and – increasingly – professional employment in the services sector. This has significant economic, social and cultural implications for all economies.

AI skills programs focusing on both domestic and cross-border opportunities are a critical precursor capability and, as stated earlier, a central element of national AI strategies. Skills development needs to embody not just AI development and enablement, but also application and maintenance, ie, AI literate “users” will be important to enable AI adoption across economic sectors.

ASOCIO suggests trade treaties and negotiations need to cover these issues. Agreements might cover cooperation and freedom of movement for, eg, students to enable rapid skill base development for those economies whose educational infrastructure is lagging, as well as skilled talent exchange programs.

The evidence presented in PwC, McKinsey and World Bank research all suggest that new, AI-enabled/supported human activities will emerge as “work”. ASOCIO notes this further underscores the importance of rapidly developing and transforming national education and dynamic skills programs to accommodate the emerging demand for new talents and capabilities.

Concurrently, governments must recognise and adapt to the immediate systemic and inevitable longer-term secular changes to economies.

## 3. Industrialisation of AI Technologies and Liability

Currently, AI systems are largely “hand-built”, bespoke developments. Technological life cycles mean that this development process will be “industrialised”; that is, in order to ensure uniform quality for an unlimited number of products, and to produce them in a timely fashion, standard, common tools and processes are created that can be used by all practitioners to produce systems at scale, of consistent quality, with easily-understood maintenance processes. This is the “inflection” point at which a technology becomes pervasive/ubiquitous.

This entails at least two sets of significant issues:

- a. Those around achieving industrialisation of AI (the capability/competitiveness/skills issues discussed earlier);
- b. The “impact” issues (social, economic, cultural) of “mass” AI – efficiency vs displacement; effectiveness vs disruption.

Business should consider these impacts because each company may face uncertainty in liability issues after an unexpected outcome from their AI development.

Agility -- timeliness of development and uptake -- will be important to ensure nations participate fully in securing the economic and social benefits offered by AI. For this reason, policymakers should minimise uncertainty in rule-setting through clear, enforceable guidance in collaborative AI development by multiple stakeholders.

Governments, national ICT associations and ASOCIO all need to plan for significant activity to assist in informing ICT industry stakeholders, academics and researchers, customers, governments and citizens regarding the implications of AI.

Actions include public-private partnerships and other collaborative initiatives to prototype and spearhead AI adoption.

For its part, ASOCIO proposes development of clear and strong guidelines to avoid any friction arising from unexpected liability issues resulting from AI related system developments.

<p><b>4. AI in the Government – operational</b></p> <p>Public sector AI has two, quite significant and very different aspects:</p> <ol style="list-style-type: none"> <li>a. The benign – quite simply, the delivery of standard public services employing AI. This includes health, education, welfare services that may be fully customised to the citizen recipient’s needs. Quality, efficient, effective. This aspect is perceived to be largely beneficial</li> <li>b. The malignant – defence, law and order, justice and emergency services – whereby AI and autonomous systems may respond to situations “with prejudice”. Many ethical and moral issues arise. Extensive fear, uncertainty, and doubt taints rational public discussion.</li> </ol>	<p>It is appropriate and timely for ASOCIO to commence the development of papers and advocacy that promotes discussion of these issues, to support industry-government consultations across the region, noting different economies/forms of government have varying tolerances to such issues. Nevertheless, ASOCIO also underscores the fundamental importance of adherence to the <a href="#">rule of law</a> and maintaining well-established human rights.</p> <ul style="list-style-type: none"> <li>• At the very least, industry and government should jointly develop guidance for safe deployment of AI solutions to provide better citizen services and efficiency improvements</li> <li>• Equally, industry-government partnerships should be encouraged to develop and deploy new services.</li> <li>• In addition to general skills development across each country, the capability of public sectors must be extended with a relevantly skilled workforce and training systems to implement and manage AI-enabled services</li> </ul>
<p><b>5. AI and big data</b></p> <p>The ability of AI systems to analyse and reveal patterns in very large data sets is already well known. However, it is important to bear in mind that as AI systems proliferate, and as different data sets are cross-matched, there is a significant risk to the very concept of personal privacy. The real-time application of these systems may, for example, reveal an individual’s precise location, current on-line or other activity, and any associations. This has both positive and negative aspects that raise legal, moral and ethical issues in AI system deployment.</p> <p>The value of data will grow exponentially; this means reducing access to data will lessen its impact even in cross border context.</p> <p>As noted earlier, careless application of AI can lead to discriminatory outcomes on the basis of, inter alia, gender, race, colour, religion and political bias.</p>	<p>Readers are urged to read <a href="#">ASOCIO’s policy guidance on data privacy</a>.</p> <p>As noted earlier, ASOCIO suggests that common ethical framework (or frameworks) be developed in collaboration with partners and governments that demonstrates the benefits of AI in improving customer service, outcomes, quality and efficiency while maintaining and enhancing the vital, mutual trust between system owner and customer. Considerable work on these types of frameworks is already underway in many economies, hence the importance of encouraging consistency and commonality across the region.</p> <p>These frameworks typically address four key areas:</p> <ol style="list-style-type: none"> <li>a. Transparently clarifying policy intent in AI systems</li> <li>b. The design and measurement of ethical outcomes</li> <li>c. Effective means of raising awareness regarding (inevitable) ethical trade-offs</li> <li>d. Improving process and culture for decision explicability and technical reliability.</li> </ol>

<p><b>6. Laws and Regulations - inhibiting or protecting?</b></p> <p>Most national laws and regulations are already well in arrears relative to the level of technology advancement (for example, cybersecurity, privacy, intellectual property to name three). Broad, scale deployment of AI systems will significantly add to this problem, especially because a key output of AI systems is “decisions”, most of which are made, hitherto, by people and frequently subject to legal review. Speed, scope and scale will make review impossible.</p>	<p>There is already equally strong evidence that AI systems themselves can be effective in enhancing legal processes (for example, consistency of judicial penalties, among others), yielding efficiency and effectiveness benefits.</p> <p>A key to this remains a strong, ethical framework for the development and deployment of systems, and undertaking persistent reviews of outcomes against the system development objectives. That these systems may have transborder effect further underlines the need for consistent approaches within sectors/activities, regions and perhaps globally.</p> <p>Transparency of processes will be critical to maintain and build trust and confidence in ethical development frameworks, and thus the systems developed using them.</p>
<p><b>7. Inclusion – poverty eradication, gender equality, social issues, and discrimination</b></p> <p>Ethically developed and applied AI systems will contribute to significant reductions in poverty, inequality, discrimination and social disruption. However, in economies where AI systems, along with other technologies, have a slower rate of deployment, these problems might be exacerbated (for example, through people smuggling, drug peddling).</p>	<p>This highlights an opportunity for the global technology sector to promote deployment of AI systems in emerging economies as a critical tool to accelerate the achievement of the UN’s <a href="#">Millennium Development Goals</a>. ASOCIO will consider its regional role in this context.</p>
<p><b>8. Foreign Policy: Geopolitics, development, and trade will all be affected by advances in AI technologies.</b></p> <p>It is fair to say nothing is left untouched as AI systems become ubiquitous. As long as AI systems are put to good use, the benefits will be profound. Yet, as with most emergent technologies, the “good use” proviso is impossible to confirm in advance. Since AI is basically “data” processing, isolated data will not produce any value for us. Hence, AI policy is equally concerned about free flow of data, enhanced access to data, sharing of data across borders, restriction of source code access, intellectual property rights and fair technology transfer.</p>	<p>That it is not possible to predict that AI (or, indeed, any new technology) might not be put to “good use” is an insufficient argument to prohibit or regulate against AI; there are very clear counter-weight benefits from the deployment and continued development of AI systems; if innovation is the risk then, we must acknowledge, innovation is equally the solution to the risk. History has repeatedly shown regulating against innovation to be fundamentally counterproductive and ultimately ineffective.</p> <p>To this end, clear, agreed common frameworks, standards and policy guidance remain critical pre-conditions to successful regional and national growth.</p>

## Conclusion

Artificial Intelligence technologies are **central to the emergence of “[Industry 4.0](#) / [Society 5.0](#)”** -- wherein industry and society are digitised to the extent that machines intelligently augment human capability in many areas including primary production, manufacturing and services (private and public).

The **impact of this on businesses, economies and society will be profound**, whether measured in GDP growth, health, education and social welfare outcomes, or in changing patterns of information exchange, learning and global development, and in transformational changes beyond our experiences.

Capturing and securing the benefits of AI, which this paper shows to be significantly beneficial, will not happen by accident. National AI strategies, addressing not just use, but participation in the development and implementation cycles already exist, are in use, or being developed in many of the world's economies. If they do not already exist, **these plans and strategies must be priority actions of governments in the ASOCIO region**. National AI strategies must be developed transparently, and with active, open consultations with all national stakeholders including the local technology sector.

National AI strategies and policies must also **reflect the regional and global context** to avoid creating trade barriers, investment uncertainty, weakening of privacy, and unintended consequences.

Core elements of a “good” national AI strategy include:

- an open, transparent business regulatory environment that highlights privacy and data protection through effective data security and governance practices;
- identifying key industries/sectors of the national economy where AI-based transformations can have the greatest impact;
- Encouraging and supporting fundamental and applied AI technology R&D activities;
- building the national digital infrastructure of broadband wired and wireless networks;
- ensuring the necessary skills base through universities and colleges -- not just for graduates -- but also to upgrade existing workforce skills; and
- emphasising the importance of ethics and the need for these to be embedded in the development and application of AIs; and
- educating businesses and consumers on the use and benefits of AI.

As with any major change that has technology at its centre, the proliferation and success of the changes that the technology enables is critically dependent on customers, citizens and society broadly having and maintaining trust and confidence in the processes and outcomes produced by the technology.

In this policy guidance, ASOCIO underscores the importance of five now well-established principles by which trust and confidence in AI technologies can be promoted:

1. Openness, transparency and explainability.
2. Reliability and safety
3. Privacy and security
4. Inclusiveness
5. Accountability

**These principles need to be understood and applied** by AI developers and policymakers alike; in applying these principles, the well-being and enhancement of all citizens and consumers should be at the forefront of design, development and deployment.

ASOCIO will facilitate this through fair, responsible and practical approaches in AI development in the Asia-Pacific region. We will work with global partners, other multilateral organisations and all stakeholders to provide better AI services, AI components and AI based integrated systems in the region.

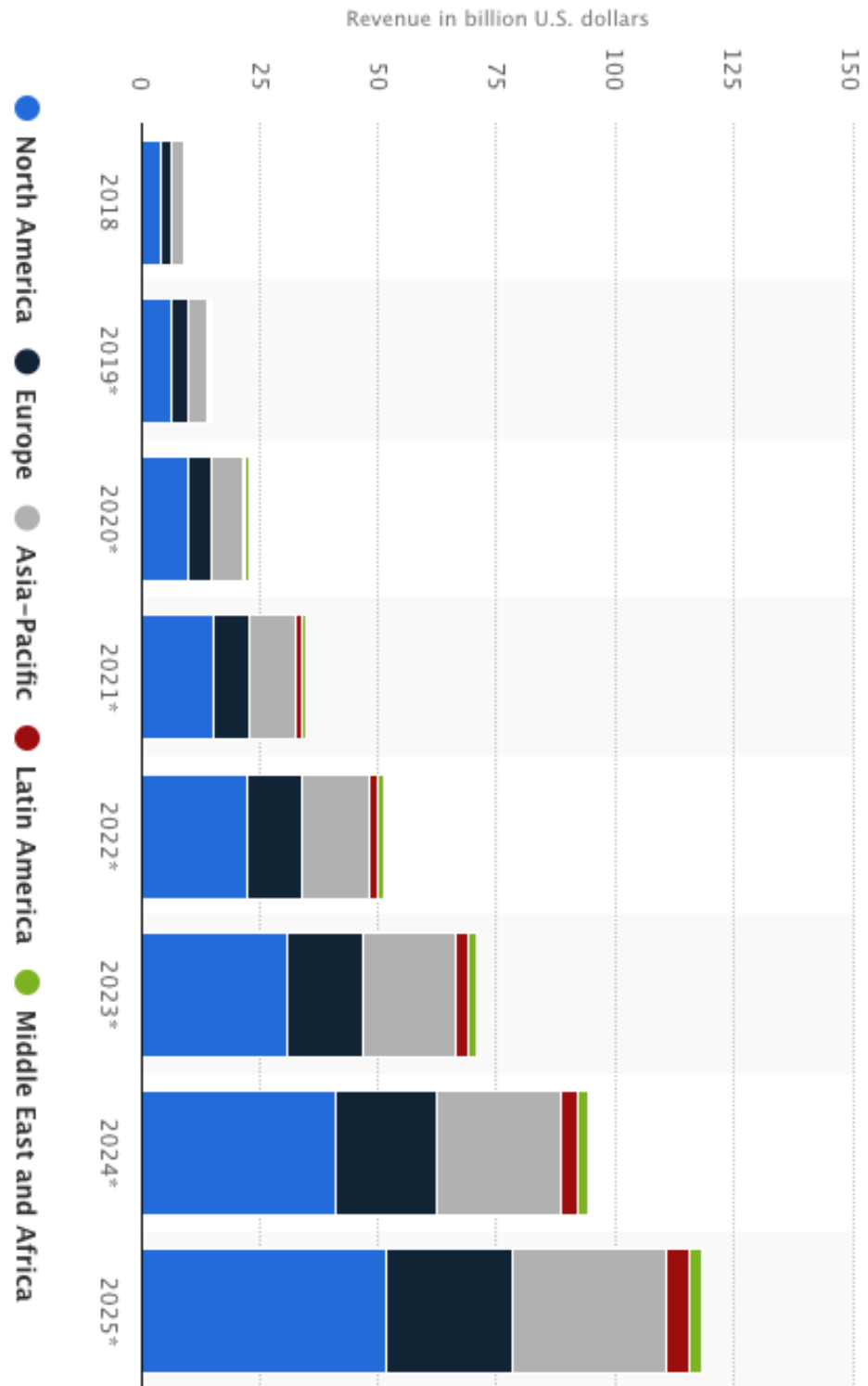
ASOCIO's focus will be to ensure social acceptance of, and trust and confidence in, AI technologies through collaborative innovation across the region. To achieve this, ASOCIO will continue to share experiences and knowledge in developing AI systems for all associations and their member companies in order to maximize opportunities and minimise risks in this important area of technology innovation.





# Appendix 1:

Figure 1: Revenues from the artificial intelligence software market worldwide from 2018 to 2025, by region (\$US Billion)



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# Appendix 2: A Checklist for AI Developers

[This interactive spreadsheet](#) enables AI development companies to understand and assess their current vs desired level of AI capability maturity.

(The illustration below is a screenshot of the tool. Use the hyperlink above to access it)

1. look and think how you evaluate these "AI"s are "not favorable"								2. Check Your Development	
AI related incidents/issues								Checklist for Your development	
Ethics in the "Automated Trolley Problem"	Killer Robots	AI automated nudity app banned	Recruiting Score negatively biased on Women	Distorted Automated Translation	The survival lottery	AI Surveillance	Deepfaked videos		
Common Items in Principles (from ASOCIO Issue paper)									Your system
<b>Openness, transparency and explainability.</b> There should be transparency and responsible disclosure around AI systems to ensure that people understand AI-based outcomes and can challenge them	Autonomous Trolley control can't/shall/will decide how many people shall be killed?	Are you sure you won't do similar development?	Are you sure you won't do similar development?	Can you explain how/why used AI, after AI biased an important decision?	Who do you think lost mind in this case? Developer? Distorted evaluation? Provider?	Are you sure you won't do similar development?			
<b>Reliability and safety</b> AI systems must function in a robust, secure and safe way throughout their life cycles and potential risks should be continually assessed and managed.	Is this a reliable and safe system development?								
<b>Privacy and security</b> AI systems should be designed in a way that respects the rule of law, human rights, democratic values and diversity, and they should include appropriate safeguards – for example, enabling human intervention where necessary – to ensure a fair and just society									
<b>Inclusiveness</b> AI should benefit people and the planet by driving inclusive growth, sustainable development and well-being.									
<b>Accountability</b> Organisations and individuals developing, deploying or operating AI systems should be held accountable for their proper functioning in line with the above principles.									

## III. Guidelines Companies AI-Ready Companies

Five developmental levels in the formation of an AI-ready company, involving the management layers, specialists, employees, and systems and data

	Management layers	Specialists	Employees	System level/data
<b>Level 5</b>	<b>Status &amp; clout as AI-powered company</b> ■ CxOs who understand the synergy of AI and data lead company- and industry-wide reforms ■ Pursuing cooperative ties industry-wide and with other firms.	■ All engineers possess field-specific AI knowledge ■ Have advanced personnel and experience in AI and data application technology and research	■ All have grounding in math, science, and AI and data ■ Collaborating with specialists inside and outside the company ■ Mid-manager support with funding and personal networking	■ All elements including real space digitized and utilized in real time ■ Field-specific AI functions, APIs, and shared PFs used in collaborative domains ■ Development and service commercialization of proprietary AI functions in competitive domains
<b>Level 4</b>	<b>Shift from AI-ready to AI-powered status</b> ■ Have personnel in management positions, who are able to understand and utilize the synergy of AI and data in operations ■ Sustained investments aimed at achieving AI-ready status	■ Have launched leading-edge projects in both technology development and research to harness the synergy of AI and data	■ Majority possess strong AI literacy ■ Organized and compliant with data ethics considerations ■ Pursuing business reforms with the synergy of AI and data	■ Seamless coordination of operational systems and analytical systems ■ Ability to analyze most business data at almost real-time speeds
<b>Level 3</b>	<b>Pursuit of AI-ready status</b> ■ AI applications integrated into management strategy. ■ Commitment to investments in AI ■ Executive AI training implemented	■ Equipped with sizable number of specialists in AI analysis and implementation ■ Able to develop and implement own AI operations	■ AI extensively used in business operations ■ Tools and procedures developed for that purpose ■ Employee AI training launched	■ Digitalize operation flow and business models ■ Database development initiated for operational systems and analytical systems ■ Selective use of AI and RPAs, etc. depending on field characteristics
<b>Level 2</b>	<b>Initial stage</b> ■ Recognize potential of AI and communicate directions ■ No detailed strategizing yet ■ Data and ethics issues not clearly defined	■ AI and data themes understood by a minority ■ Existing tech applied in collaboration with outside partners	■ Some employees understand AI basics ■ Some employees have grounding in AI and data ■ Hiring of AI human resources initiated	■ Some operations fully utilizing AI functions ■ Some data available in formats enabling analysis and utilization ■ Digitalization of customer behavior, environments, and real spaces not yet started
<b>Level 1</b>	<b>Preliminary stage</b> ■ Zero understanding of AI ■ Poor awareness of the business impact AI can have on own company or industry	■ Systems mainly outsourced ■ IT division functions as link to IT company	■ Rely mainly on experience, intuition, and personal skills ■ Issues handled with a lot of manpower and man-hours ■ Dual-track hiring for engineer	■ Overgrown legacy systems ■ Time needed for data collection, retrieval, and integration measured in years ■ Poor grasp of data content and implications

# Acknowledgement

This policy guidance has been prepared by ASOCIO's Policy Task Force, whose time, effort and contribution is gratefully acknowledged. Members of the 2019 Policy Task Force:

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