BUILDING AN AI WORLD

Report on National and Regional AI Strategies

Lead Author:
Tim Dutton

Contributing Authors:
Brent Barron, Gaga Boskovic

CIFAR

About CIFAR

CIFAR brings together outstanding researchers from across disciplines and borders to address important challenges facing the world. We support leading edge research with the potential for global impact.

Established in 1982, CIFAR is a Canadian-based, international research institute with nearly 400 fellows, scholars and advisors from 18 countries.

Find out more at **cifar.ca**

In March 2017, the Government of Canada announced the launch of the Pan-Canadian AI Strategy. The first fully-funded strategy of its kind, Canada's AI strategy was followed by announcements of a variety of forms of AI strategies by 18 countries, including France, Mexico, the UAE, and China. The attention to AI is not misplaced given the potential benefits: McKinsey estimates that AI could enable US$13 trillion in additional economic activity by 2030, representing an additional 1.2 percent growth in GDP.[1] Governments worldwide have responded by positioning their unique research and industrial strengths through new national strategies to drive growth and competitiveness in an AI world.

This report surveys the current landscape of national and regional artificial intelligence (AI) strategies as of November 2018. It defines what an AI strategy is, lists the strategies that have been announced, and provides a framework for understanding the different types of strategies. In doing so, the report does not attempt to compare or evaluate the respective strategies, but is intended to provide an overview of their strategic priorities for policymakers, businesses, and civil society actors.

Key findings:

» Of the 18 AI strategies released to date, nine are fully funded and outline specific policies, and nine are guiding documents that present objectives to guide future policymaking.

» AI strategies are described according to eight areas of public policy where they are intended to have impact: scientific research, talent development, skills development, industrialization, ethics, data and digital infrastructure, government services, and inclusion.

» Each AI strategy is unique and focuses on different aspects of AI policy. However, the strategies can be categorized generally into four main types: research and talent, industrialization, comprehensive, and guiding.

» Although the AI strategies do not share the same strategic priorities, industrialization is the top priority for 8 of the 18 of the national strategies, with scientific research identified as a top priority for 7 strategies.

1 Bughin, J. et al (2018). Notes from the AI Frontier: Modeling the Impact of AI on the World Economy. https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20Modeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.ashx

Introduction

In March 2017, Canada became the first country or region to release and implement a strategy to promote the use and development of AI. Since then, 17 governments have released multi-million-dollar (or in some cases billion-dollar) strategies related to the future of AI. Ten other governments have announced their intention to release a strategy in the coming year, with more likely to follow suit. This is the first time that governments around the world have almost simultaneously released national plans to develop the same technology.

The strategies vary substantially: some focus exclusively on private-sector AI applications or fundamental research, while others are comprehensive and include initiatives to promote open data, ethical standards, and skills development.

To make sense of this rapidly changing field, Section 2 of this report lists each strategy, its level of funding, and whether it has been implemented. It also identifies countries that have announced the intention to release a strategy in the future.

Section 3 introduces a framework for broadly categorizing AI strategies according to eight areas of public policy, and develops a ranking for these strategic priorities.

This report does not aim to compare or evaluate the various strategies. Rather, it seeks to advance the global dialogue on AI by informing policymakers, businesses, and civil society actors about the current landscape of AI strategies and where different governments, including Canada, are focusing their efforts.

Landscape of AI Strategies 2018

For the purposes of this report, an AI strategy is defined as a set of coordinated government policies that have a clear objective of maximizing the potential benefits and minimizing the potential costs of AI for the economy and society. The key word in this definition is *coordinated* because some countries have related AI policies in place that are *uncoordinated*. This is the case in the United States, for example, where the federal government invests in AI research and works to remove regulatory barriers in the absence of an overarching strategy to guide policymakers. This report does not include countries in which broader innovation or government transformation strategies include, but do not focus on, AI. Examples of these include the Czech Republic's RIS3 Strategy and Brazil's E-Digital Strategy. It also does not include single AI-related initiatives that are not part of a strategy, such as Nigeria's announcement of a new National Agency for Research in Robotics and Artificial Intelligence.

Current AI strategies can be divided into two broad groups. The first group comprises strategies that, when first announced, included specific policies and funding. In March 2018, President Macron announced France's AI strategy, which included €1.5 billion in funding to create a national network of research institutes, develop an open data policy, and fund AI start-ups and national champions. The second group is made up of strategies that feature "guiding" documents. These strategies were not funded when first announced; instead, they outlined strategic objectives to guide future policymaking. Some of them, developed by external task forces, recommended specific policies, but without a commitment to implementation.

Table 1 shows the nine governments with fully funded AI strategies. Funding varies significantly: Australia's strategy is less than US$25 million, while South Korea's strategy is nearly US$2 billion.

Table 1: Funded Strategies

Country/ Region	Release Date	Official Strategy	Funding (July 2018 US$ exchange rates)
Australia	May 2018	Australian Technology and Science Growth Plan	AUD$29.9 million (US$21.6 million)
Canada	March 2017	Pan-Canadian Artificial Intelligence Strategy	C$125 million (US$95 million)
Singapore	May 2017	AI Singapore	S$150 million over five years (US$91.5 million)
Denmark	January 2018	Strategy for Denmark's Digital Growth	DKK 75 million in 2018, followed by DKK 125 million each year to 2025 (US$11.7 million, US$19.5 million)
Taiwan	January 2018	Taiwan AI Action Plan	NT 36 billion over four years (US$1.18 billion)
France	March 2018	France's Strategy for AI	€1.5 billion over five years (US$1.75 billion)
EU Commission	April 2018	Communication Artificial Intelligence for Europe	Increase annual investment in AI to €1.5 billion by end of 2020 (US$1.75 billion)
United Kingdom	April 2018	Industrial Strategy: Artificial Intelligence Sector Deal	£950 million from government, academia, and industry (US$1.24 billion)
South Korea	May 2018	Artificial Intelligence R&D Strategy	2.2 trillion (US$1.95 billion)

Table 2 lists the nine governments that have released guiding documents. Of these, Japan, China, the United Arab Emirates (UAE), Finland, and Sweden have already begun implementation. China's Next Generation AI Plan, for example, outlined a number of possible initiatives that the government could implement in the future, including the construction of AI industrial parks and the integration of AI courses in primary and secondary school. The Chinese government has since announced details and funding for a US$2 billion AI park[2] to house up to 400 companies and released an AI textbook[3] for high school students.

Countries can have both a guiding document and a fully funded strategy. Before the release of its AI Sector Deal, for example, the UK government commissioned Professor Dame Wendy Hall and former IBM Watson Vice President Jerome Pesenti to conduct an independent review of the AI industry. The resulting report, *Growing the Artificial Intelligence Industry* in the UK, was released in October 2017 and many of its 18 recommendations were incorporated into the final AI strategy six months later. Similarly, France's strategy is largely based on Cédric Villani's report, *For a Meaningful Artificial Intelligence*, which was released alongside France's official strategy.

Table 2: Guiding Documents

Country/Region	Release Date	Guiding Document	Implemented? (As of November 2018)
Japan	March 2017	Artificial Intelligence Technology Strategy	Yes
China	July 2017	A Next Generation Artificial Intelligence Development Plan	Yes
UAE	October 2017	UAE Strategy for Artificial Intelligence	Yes
Finland	December 2017	Finland's Age of Artificial Intelligence	Yes
Italy	March 2018	Artificial Intelligence at the Service of Citizens	Partially
Sweden	May 2018	National Approach for Artificial Intelligence	Yes
India	June 2018	National Strategy for Artificial Intelligence: #AIforAll	No
Mexico	June 2018	Towards an AI Strategy in Mexico: Harnessing the AI Revolution	No
Germany	July 2018	Key points of the Federal Government for an AI Strategy	No

Table 3 focuses on a third group of countries/regions that have indicated they are developing an AI strategy. Germany and the European Union, for example, have announced that they will be releasing fully funded plans by the end of 2018.

2 https://www.reuters.com/article/us-china-artificial-intelligence/beijing-to-build-2-billion-ai-research-park-xinhua-idUSKBN1ES0B8
3 https://www.scmp.com/tech/china-tech/article/2144396/china-looks-school-kids-win-global-ai-race

Table 3: Strategies in Development

Country/Region	Current Status
Austria	In August 2017, the Austrian government established a Robot Council tasked with developing a comprehensive robotics and AI strategy within two years. The Council is an advisory body that will support the Ministry of Infrastructure, with an operating budget of 1 million euros. It was also announced that a formal proposal would be submitted to the Council of Ministers in November 2018.[4]
Estonia	The government is currently establishing an AI Task Force mandated to define national legal, business/industry, and communications strategies.
EU	The Commission's Communication on AI announced that it is currently working with member states to develop a coordinated plan on AI by the end of 2018.
Germany	The government announced in July 2018 that it will release its AI strategy during the 2018 Digital Summit in Nuremberg on December 3–4, 2018.
Israel	Though AI start-ups are benefitting from Israel's excellent innovation ecosystem, the government does not yet have a targeted AI strategy in place. However, it recently announced five committees to help develop a strategy.
Kenya	The government revealed the formation of an 11-person[5] task force in February 2018 to develop a blockchain and AI strategy.
Malaysia	In October 2017 the government announced that the Malaysia Digital Economy Corporation has been tasked with developing a national framework for AI.[6]
Malta	Malta's Junior Minister announced in November 2018 that Malta had launched an AI task force, focusing on industrialization and creating the world's first citizenship test for robots.[7]
New Zealand	The AI Forum of NZ's May 2017 report called on the government to develop a national AI strategy. Clare Curran, the Minister of Broadcasting, Communications and Digital Media, subsequently announced that the government is exploring the development of an AI action plan.[8]
Poland	The government started consultations for development of its national AI strategy in May 2018.
Sri Lanka	The National Export Strategy Advisory Committee announced in August 2018 that the country was working on a strategy with the aim of positioning Sri Lanka as a country with AI capabilities.[9]
Tunisia	In April 2018 the government launched the development of a national AI strategy, scheduled to be released in the first quarter of 2019.

4 https://derstandard.at/2000092318194/Oesterreich-soll-Strategie-fuer-Kuenstliche-Intelligenz-bekommen
5 https://kenyanwallstreet.com/kenya-govt-unveils-11-member-blockchain-ai-taskforce-headed-by-bitange-ndemo/
6 https://www.opengovasia.com/articles/8170-plans-for-cloud-first-strategy-and-national-ai-framework-revealed-at-29th-msc-malaysia-implementation-council-meeting
7 https://www.forbes.com/sites/rachelwolfson/2018/11/01/after-becoming-the-blockchain-island-malta-announces-its-formulating-a-national-ai-strategy/#7c25f9fb5cf3
8 https://www.zdnet.com/article/new-zealand-examining-ai-ethical-framework-and-action-plan/
9 http://www.ft.lk/it-telecom-tech/Sri-Lanka-to-launch-AI-Nation-as-next-wave-of-IT-growth/50-661730

A fourth group features countries that do not have a coordinated AI strategy, but have related policies in place. The United States and Russia are currently the only members of this group. Both are widely seen as key actors in the "global AI race" and fund a substantial amount of AI research through their militaries.

The map shown in Figure 1 visualizes the current landscape of national and regional AI strategies. Appendix 1 provides additional information on the policies of each strategy.

Figure 1: Current Landscape of AI Strategies

Funded and implemented strategy   **Guiding document; not implemented**   **Working on a strategy**
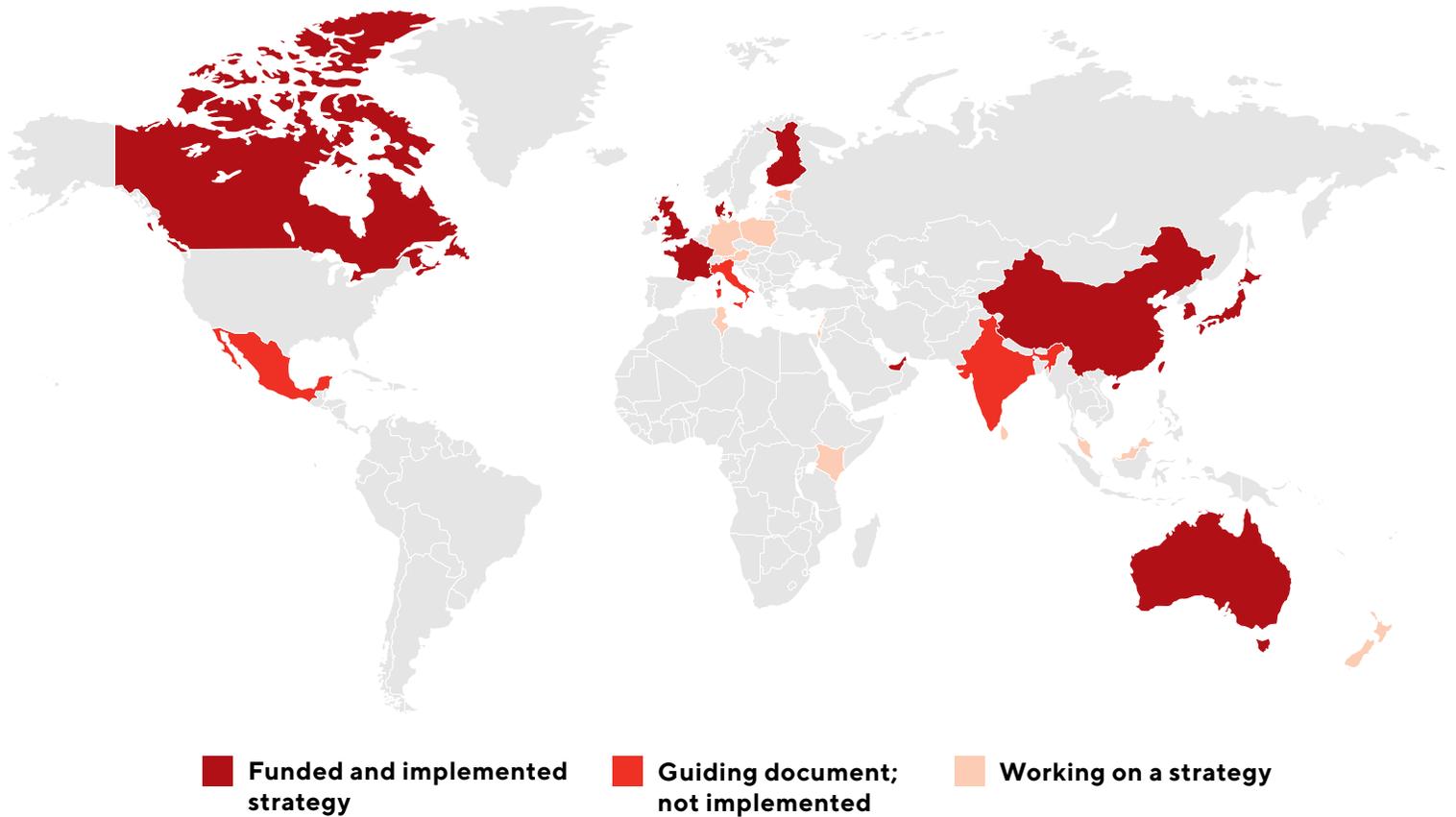
Strategic Priorities of AI Strategies

What is unique about this area of policy development is the wide range of approaches that governments around the globe have taken to promote the use and development of AI. They not only advance different policies, but also focus on different areas of public policy.

Since the AI field is young and fast-moving, the analysis here focuses on the strategic priorities of each strategy rather than on the policies themselves nor the funding levels. Although it is too early to determine best practices, this section explores how different countries are approaching the same issue.

Methodology

This framework broadly categorizes AI strategies according to public policy areas and assesses each of their strategic priorities relative to funding and focus through a heat map (see explanation below). Development of the list of strategies in Section 2 was hindered by two challenges. First, AI strategies differ substantially; they may be in the form of a website, an official white paper, a task force report, or a budget announcement. It is possible, therefore, that, due to the field's rapid and diverse development, a strategy may have been overlooked. Second, some governments have announced new initiatives since releasing their original strategies. To enable a more systematic review of each strategy, this analysis only focuses on what was included in the strategy when it was first announced.

The policy announcements of each strategy were categorized into eight areas of public policy:

» **Scientific Research:** The creation of new research centres, hubs, or programs in basic and applied AI research or a commitment to increase existing funding for public AI research.

» **AI Talent Development:** Funding to attract, retain, and train domestic or international AI talent, including funding for chairs and fellowships or the creation of AI-specific Master and PhD programs.

» **Skills and the Future of Work:** Initiatives to help students and the overall labour force develop skills for the future of work, such as investments in STEM (science, technology, engineering, and mathematics) education, digital skills, or lifelong learning.

» **Industrialization of AI Technologies:** Programs to encourage private-sector adoption of AI technologies, including investments in strategic sectors, funding for AI start-ups and small and medium-sized enterprises (SMEs), and strategies to create AI clusters or ecosystems.

» **Ethical AI Standards:** The creation of a council, committee, or task force to create standards or regulations for the ethical use and development of AI. This area also includes specific funding for research or pilot programs to create explainable and transparent AI.

» **Data and Digital Infrastructure:** Funding for open data partnerships, platforms, and datasets, as well as commitments to create test environments and regulatory sandboxes.

» **AI in the Government:** Pilot programs that use AI to improve government efficiency, service delivery, and public administration.

» **Inclusion and Social Well-Being:** Ensuring that AI is used to promote social and inclusive growth and that the AI community is inclusive of diverse backgrounds and perspectives.

Based on an assessment of the amount of funding and attention each policy area received in a strategy, a measure of emphasis was developed. These are displayed in Table 4, with the darkest shading representing the greatest emphasis. Note that emphasis is assessed in the context of a single strategy and not across jurisdictions. For example, a light green in one country could very well represent greater investment in an area than dark green in another country if the first country is making large absolute investments. This report does not assess the relative emphasis from one country to another, and should not be read as such.

Table 4: AI Strategies Heat Map

	Research	AI Talent	Future of Work	Industrial Strategy	Ethics	Data	AI in Gov't	Inclusion
Australia								
Canada								
China								
Denmark								
EU								
Finland								
France								
Germany								
India								
Italy								
Japan								
Mexico								
Singapore								
South Korea								
Sweden								
Taiwan								
UAE								
UK								

Results

The key finding is that nearly all of the 18 strategies are unique, with only Australia and Singapore sharing similar areas of focus and investment. From this analysis, it is clear that governments are taking very different approaches to promote the development of the same technology.

Nevertheless, the strategies have some similarities:

» Industrialization is the most highly prioritized, with 8 of 18 countries ranking it as the most strategically important policy area. Research, at 7 countries, is a very close second.

» Research or industrialization are the largest area of emphasis for 15 of the national strategies, indicating that the majority focus on basic and applied research or the application of AI technologies in the private sector.

» These are not mutually exclusive features since research and industrialization are among their top three priorities of 16 and 13 strategies, respectively.

» Only five strategies touch on all eight policy areas, while seven are quite focused and touch on four or fewer areas.

» Inclusion and the future of work, respectively, were the least and second-least prioritized policy areas.

Grouping funded strategies with similar areas of emphasis reveals three broad types of AI strategies–research and talent, industrialization, and comprehensive–in addition to unfunded guiding documents.

Those in the first group of strategies (Figure 2) focus almost exclusively on research and talent. For example, Canada's strategy establishes three new AI research institutes and provides funding to attract and retain AI talent. Similarly, South Korea's strategy will create five new AI research centres and six new graduate programs to train 5,000 AI specialists. Although Canada's research institutes will collaborate with the private sector and South Korea's strategy will fund industrial projects, these initiatives are not the top priority.

In contrast, although the strategies of Australia, Denmark, Singapore, and Taiwan do fund AI research and talent development, their key focus is the use of AI technologies in the private sector. Major initiatives of this group (Figure 3) are different in terms of scope and policy instruments, but their common goal is to grow a cluster of AI companies in their respective regions, or to enhance existing businesses with greater capacity for AI.

The third group features the comprehensive strategies that fund nearly all eight policy areas (Figure 4). The U.K. strategy, for example, increases funding for AI research, supports the creation of Alan Turing AI Fellowships, provides new funding for STEM education, secures over £300 million in private-sector investment, creates a new Centre for Data Ethics, announces new investments in digital infrastructure, and establishes a new AI Council to advise the government. The aims of the UK strategy are far more comprehensive than the research & talent and industrialization strategies.

The final group of strategies is made up of the guiding documents discussed in Section 2. These strategies are not funded and serve the strategic purpose of advising policymakers what they should do in the future vis-à-vis AI policy. As a result, they are, collectively, more comprehensive and varied than the fully funded strategies. Some include specific policy recommendations: the first interim report by Finland's AI task force, for instance, outlines policies to position Finland as a global leader in the application of AI. However, the majority of these strategies are broader in scope. Those of China, Germany, and India include policy goals and aspirations in all eight policy areas. When Germany releases its funded AI strategy in December 2018, it will likely fall into the comprehensive category along with France and the United Kingdom.

Figure 2: Research and Talent Strategies

	Country	
	Canada	South Korea
Research		
AI Talent		
Industrial Strategy		
Ethics		
Data		
AI in Gov		
Future of Work		
Inclusion		
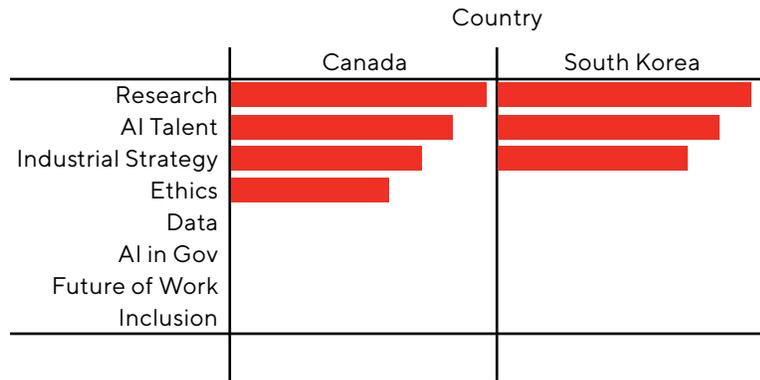
Figure 3: Industrialization Strategies

	Country			
	Australia	Denmark	Singapore	Taiwan
Research				
AI Talent				
Industrial Strategy				
Ethics				
Data				
AI in Gov				
Future of Work				
Inclusion				
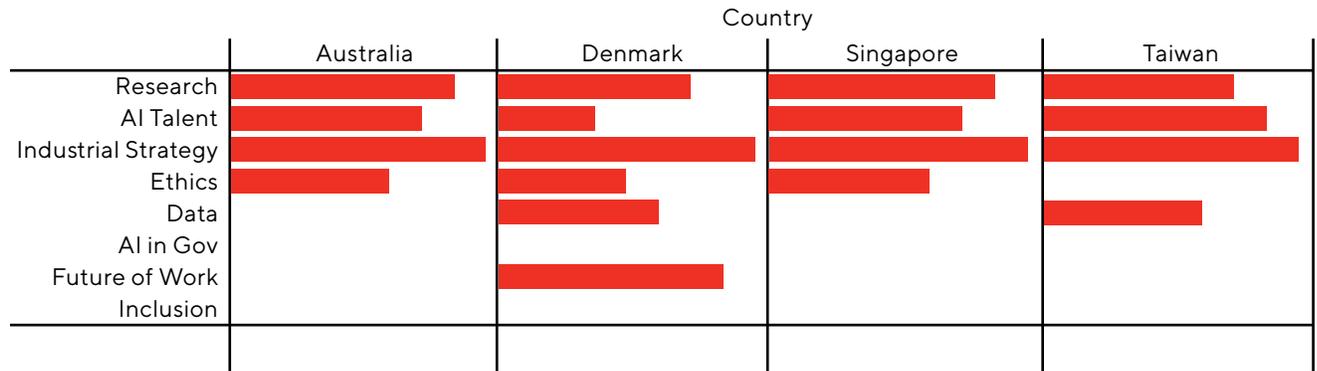
Figure 4: Comprehensive Strategies

	Country		
	EU	France	UK
Research			
AI Talent			
Industrial Strategy			
Ethics			
Data			
AI in Gov			
Future of Work			
Inclusion			
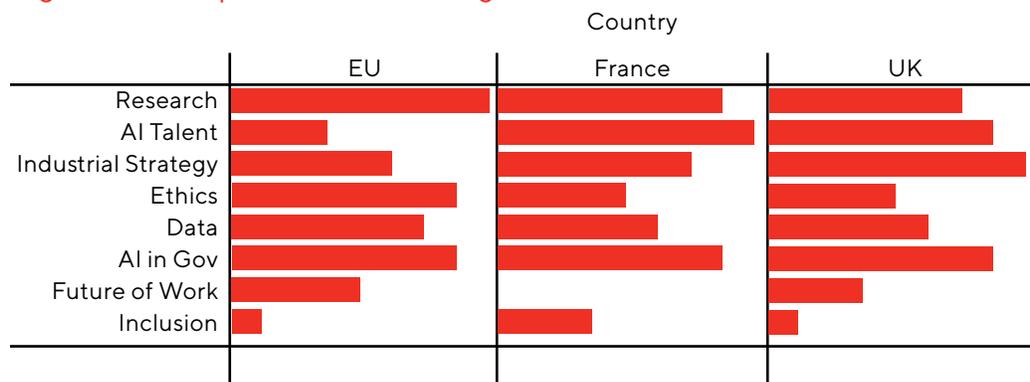
Conclusion

The recent flurry of AI strategies signals a growing interest among policymakers around the world in the potential benefits and costs of AI. This report finds that of the 18 AI strategies released to date, none of them have the same set of strategic priorities. Many share common characteristics, but each is unique. Businesses, policymakers, and civil society actors need to keep this complexity in mind as they navigate the emerging field of AI policy. Tracking the evolution of these strategies and the arrival of new strategies will be critical moving forward in understanding this evolving area of policy development.

Appendix: A-Z National Strategy Profiles

Country	Australia		
Title	Australian Technology and Science Growth Plan[10]		
Funding	AUD$29.9 million (US$21.6 million)		
Overall Goal of AI Strategy	Strengthen Australia's capability in AI and Machine Learning (ML), supporting economic growth and the productivity of Australian businesses.		
New Offices and Institutions			
Policy Elements	Research	•	Additional funding to the Cooperative Research Centres Program to support projects related to AI and ML.
	AI Talent	•	Funding for AI and ML-focused PhD scholarships and school-related learning to address skill gaps.
	Future of Work		
	Industrial Policy	•	Develop a Technology Roadmap, Standards Framework to identify global opportunities and guide future investments.
	Ethics	•	Develop a national AI Ethics Framework for responsible AI.
	Data & Digital Infrastructure		

10 https://www.budget.gov.au/2018-19/content/bp2/download/bp2_expense.pdf

Country		Canada
Title		Pan-Canadian AI Strategy[11]
Funding		C$125 million (US$95 million)
Overall Goal of AI Strategy		Enhance Canada's international profile in AI research and training
Policy Elements	Research	• Establish three centres of scientific excellence in AI to generate world class research and innovation
	AI Talent	• Centres and CIFAR Chairs in AI designed to attract, retain, and train talent
	Future of Work	
	Industrial Policy	• Research centres will work with industry to connect academic research to business
	Ethics	• Develop thought leadership on ethical implications of AI through CIFAR's AI & Society program
	Data & Digital Infrastructure	
	AI in Government	
	Inclusion	

11 https://www.cifar.ca/assets/pan-canadian-artificial-intelligence-strategy-overview/

Country		China
Title		A Next Generation Artificial Intelligence Development Plan[12]
Funding		
Overall Goal of AI Strategy		Three phase strategy to make China the world leader in AI theories, technologies, and applications by 2030
Policy Elements	Research	• Achieve major breakthroughs in fundamental AI research • Research mega-projects
	AI Talent	• Development of AI talent pool • AI and "AI + X" degrees
	Future of Work	• Encourage companies to provide skills training • Improve government re-employment training
	Industrial Policy	• Make China the world's primary AI innovation center • Develop industrial parks and new AI businesses
	Ethics	• Establish explainability and accountability system • Lead world in AI standard setting and code of ethics
	Data & Digital Infrastructure	• Use data and open-source platforms for growth • Create construct public data sets and cloud service platforms
	AI in Government	• New AI government offices • AI platform to integrate AI into government services and decision making
	Inclusion	• Integrate AI into health care, education, and pensions to improve quality of life • Maintain social stability

12 https://www.fhi.ox.ac.uk/wp-content/uploads/Deciphering_Chinas_AI-Dream.pdf
https://www.newamerica.org/cybersecurity-initiative/blog/chinas-plan-lead-ai-purpose-prospects-and-problems/
https://www.newamerica.org/cybersecurity-initiative/digichina/blog/translation-chinese-government-outlines-ai-ambitions-through-2020/
https://thediplomat.com/2018/02/chinas-ai-agenda-advances/

Country	Denmark
Title	Strategy for Denmark's Digital Growth[13]
Funding	DKK 75 million in 2018, followed by DKK 125 million each year to 2025 (US$11.7 million, US$19.5 million)
Overall Goal of AI Strategy	Make Denmark a frontrunner in the digital economy and the Danish people the most digitally skilled in the EU

Policy Elements	Research	• National Centre for Research in Digital Technologies to increase research and business collaboration
	AI Talent	• Indirectly attract talent through creation of Digital Hub Denmark
	Future of Work	• Technology pact to improve digital skills • Understanding of technology in primary school • STEM education investment
	Industrial Policy	• Support and market Denmark as leader in digital technologies
	Ethics	• Danish Disruption Council will develop ethical recommendations for data
	Data & Digital Infrastructure	• Open data partnership • Digital export certificates • Data standards • Cybersecurity enhancement
	AI in Government	
	Inclusion	

Country	European Union
Title	Communication on Artificial Intelligence for Europe[14]
Funding	Increase annual investment in AI to €1.5 billion by end of 2020 (US$1.75 billion)
Overall Goal of AI Strategy	Increase AI uptake across the economy, prepare for socio-economic change, and ensure an ethical framework exists
New Offices and Institutions	• Increase investment in AI research to spur EU-wide public and private investment • Strengthen AI research hubs

Policy Elements	Research	• Encourage business-education partnership through Digital Skills and Jobs Coalition to attract and retain talent
	AI Talent	• Support member states' efforts / Publish report on labour market impact of AI / Support digital skills
	Future of Work	• Support member states' efforts / Publish report on labour market impact of AI / Support digital skills
	Industrial Policy	• AI-on-demand platform to help SMEs and public sector use AI / Help members create own AI strategy
	Ethics	• Develop AI ethical guidelines by end of 2018 / Pilot programme on explainable AI
	Data & Digital Infrastructure	• Centre for data sharing / further expand access to public data / GDPR
	AI in Government	• Facilitate uptake of AI by public administrations
	Inclusion	• Goal to make AI talent pool more diverse

14 https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe

Country	Finland
Title	Finland's Age of Artificial Intelligence[15]
Funding	
Overall Goal of AI Strategy	Leverage existing strengths to become the global leader in the application of AI

Policy Elements	Research	• Finnish Centre for AI and applied basic research • Increase innovation and research funding
	AI Talent	• Finnish Centre for AI to develop and recruit talent • Masters of AI • International campaign to recruit talent
	Future of Work	• Teach AI literacy through massive open online courses • Skills voucher
	Industrial Policy	• Focus on application of AI in business • Applied research in research centre • AI accelerators
	Ethics	• Conduct public consultations for a future report
	Data & Digital Infrastructure	• Encourage data sharing and regulatory sandboxes • MyData legislation for data rights
	AI in Government	• Goal of becoming most advanced public administration • Public sector chatbot (Aurora) • AI team in PMO
	Inclusion	

Country		France
Title		France's Strategy for AI[16]
Funding		€1.5 billion over five years (US$1.75 billion)
Overall Goal of AI Strategy		Strengthen France's AI ecosystem, leverage public data, fund specific sectors, and create regulations for AI
Policy Elements	Research	• Network of four to five AI research institutes
	AI Talent	• Attract and train talent in institutes • Research chairs • Double trained AI practitioners in five years
	Future of Work	
	Industrial Policy	• Funding for AI startups and industrial projects • European DARPA-style organization • Attracted private sector FDI • Fund national champions
	Ethics	• International group of experts to develop ethical framework • All public algorithms be transparent and explainable
	Data & Digital Infrastructure	• Open data policy for growth • Shared data platforms • Health data hub • Personal privacy protection
	AI in Government	• Use AI to improve public services
	Inclusion	• Encourage diversity in AI • Government investment in companies that demonstrate non-discriminatory AI

Country	Germany	
Title	Key points for a Federal Government Strategy on AI[17]	
Funding		
Overall Goal of AI Strategy	Make Germany and Europe the world leader in AI research and AI applications	
Policy Elements	Research	• Strengthen and expand AI research • Franco-German research collaboration • Review funding schemes
	AI Talent	• Develop framework to attract and retain talent • AI chairs • AI education programs
	Future of Work	• Regular study and monitor impact of AI on future of work • Develop national training strategy
	Industrial Policy	• Strengthen industry-academia collaboration • New cluster strategy • Support for SMEs and start-ups
	Ethics	• Data Ethics Committee • Encourage transparency and traceability in AI
	Data & Digital Infrastructure	• Create an open data strategy • Further European Data Area • Develop data partnerships • Sector-Specific Rules
	AI in Government	• Pioneer use of AI in government to improve efficiency and service delivery
	Inclusion	• Strengthen social partnerships and include all actors in consultation • Promote diversity in AI

Country	India	
Title	National Strategy for Artificial intelligence: #AIforAll	
Funding		
Overall Goal of AI Strategy	Leverage AI for economic growth, social inclusion, and inclusive growth – #AIforAll	
Policy Elements	Research	• Two tiered research strategy – new centres for basic research and new centres for applied research
	AI Talent	• AI Fellowships • Faculty chairs in AI
	Future of Work	• Task force for employment changes • Data science training camp • Massive open online courses and bridge courses for non-AI specialists
	Industrial Policy	• Health, education, agriculture, mobility, and cities • National AI marketplace • Startup incubation hubs
	Ethics	• Ethics councils at each research centre • Sector specific guidelines for privacy, security, and ethics
	Data & Digital Infrastructure	• Open data platforms • India-specific annotated datasets • National AI marketplace • Data protection framework
	AI in Government	• Educate policymakers about AI • Adopt AI solutions in government to create social impact
	Inclusion	• Overarching goal of strategy is to leverage AI for inclusion

Country	Italy
Title	Artificial Intelligence at the Service of Citizens[18]
Funding	
Overall Goal of AI Strategy	Facilitate the adoption of AI in the Italian Public Administration

Policy Elements	Research	
	AI Talent	• Provide training paths for workers with the ability to understand and implement AI solutions in government
	Future of Work	
	Industrial Policy	
	Ethics	• Trans-Disciplinary Centre on AI to lead the debate on ethics and involve experts and citizens in the regulation of AI
	Data & Digital Infrastructure	• National AI platform to support annotation of data
	AI in Government	• National Competence Centre to ingreate AI in government / collaboration to adopt AI solutions in government
	Inclusion	

18 https://ia.italia.it/en/

Country		Japan
Title		Artificial Intelligence Technology Strategy[19]
Funding		
Overall Goal of AI Strategy		Industrialize AI in priority sectors related to social issues Japan and world faces
Policy Elements	Research	• Existing research centres will become new hubs for industry–academia–government AI R&D projects
	AI Talent	• Address shortage of AI talent: new education programs; attract talent with AI centres; provide higher salaries
	Future of Work	
	Industrial Policy	• Industrialization roadmap for health, medical care and welfare and mobility / Provide support for start ups
	Ethics	• Trans–Disciplinary Centre on AI to lead the debate on ethics and involve experts and citizens in the regulation of AI
	Data & Digital Infrastructure	• Improve data maintenance / create environments to test AI
	AI in Government	• National Competence Centre to ingreate AI in government / collaboration to adopt AI solutions in government
	Inclusion	

19 http://www.nedo.go.jp/content/100865202.pdf
   https://japan.kantei.go.jp/97_abe/actions/201604/12article6.html

Country	Mexico
Title	Towards an AI Strategy in Mexico: Harnessing the AI Revolution
Funding	
Overall Goal of AI Strategy	Set a strategic direction, invest in data and research, and support learning to help adapt to technological change

Policy Elements	Research	• National centre AI research / Strengthen academia-industry connections / Create an AI government fund
	AI Talent	• Increase Masters and PhD Students in AI and data science / Tools for continued education in AI
	Future of Work	• Broaden AI learning beyond STEM students in public and private universities
	Industrial Policy	• Prioritize support for local AI startups
	Ethics	• Create a Mexican AI Ethics Council
	Data & Digital Infrastructure	• Maintain a resilient open data infrastructure / Training data to inform AI applications /Protect personal privacy
	AI in Government	• Strategically use government procurement to create AI technologies
	Inclusion	

Country		Singapore
Title		AI Singapore[20]
Funding		S$150 million over five years (US$91.5 million)
Overall Goal of AI Strategy		Use AI to create social and economic impacts, build an AI ecosystem, and put Singapore on the world map for AI
Policy Elements	Research	• Call for AI research proposals in explainability, learning from small datasets, AI safety, AI alignment, and AI creativity
	AI Talent	• AI Apprenticeship Programme: a 9-month structured program to foster a new cohort of AI talent in Singapore
	Future of Work	• Broaden AI learning beyond STEM students in public and private universities
	Industrial Policy	• Develop an AI ecosystem: Grand Challenges, 100 Experiments
	Ethics	• Ethics of AI is a suggested topic for funding in AI research
	Data & Digital Infrastructure	
	AI in Government	
	Inclusion	

20 https://www.aisingapore.org/

Country		South Korea
Title		Artificial Intelligence R&D Strategy[21]
Funding		2.2 trillion (US$1.95 billion)
Overall Goal of AI Strategy		Transform SK into an AI heavyweight by 2022 and catch up to the US and China in AI capabilities
Policy Elements	Research	• Five new AI research centers to research how to integrate AI into robotics, bioscience, machinery, and automobiles
	AI Talent	• Six new AI graduate programs by 2022 to train 5000 AI specialists
	Future of Work	
	Industrial Policy	• Large-scale projects in defence, medicine, and safety / Asia AI Hub / Semiconductor, supercomputer, AI chips
	Ethics	
	Data & Digital Infrastructure	
	AI in Government	
	Inclusion	

Country		Taiwan
Title		Taiwan AI Action Plan[22]
Funding		NT 36 billion over four years (US$1.18 billion)
Overall Goal of AI Strategy		Build an AI Innovation ecosystem that makes Taiwan a hub for AI development and industries and applications.
Policy Elements	Research	• Advanced research for AI / National AI Forward-looking Research Network
	AI Talent	• AI Talent Program: 1,000 AI researchers, 10,000 AI professionals, recruit international talent
	Future of Work	
	Industrial Policy	• AI International Innovation Hub for 100 start ups / integration into 5 + 2 industrial strategy
	Ethics	
	Data & Digital Infrastructure	• Open data test fields to test AI solutions / Research relevant laws and regulations
	AI in Government	
	Inclusion	

22 https://ai.taiwan.gov.tw/news/cabinet-plans-to-develop-the-nations-ai-industry/#
https://ai.taiwan.gov.tw/#actionplan

Country	United Arab Emirates	
Title	UAE Strategy for Artificial Intelligence[23]	
Funding		
Overall Goal of AI Strategy	Puts AI at the center of the government's strategic plans to improve government performance and efficiency	
Policy Elements	Research	
	AI Talent	• Training course for government officials in AI
	Future of Work	
	Industrial Policy	• Apply AI to 9 sectors: health transport space, renewable energy, education, technology, water, environment, traffic
	Ethics	• Considering a law on the safe use of AI
	Data & Digital Infrastructure	
	AI in Government	• Overall strategy aims to make the UAE's government more efficient and effective
	Inclusion	

23 https://government.ae/en/about-the-uae/strategies-initiatives-and-awards/federal-governments-strategies-and-plans/
uae-strategy-for-artificial-intelligence
https://www.opengovasia.com/articles/dubai-higher-colleges-of-technology-promotes-ai-training-and-national-capacity-
building

Country	United Kingdom	
Title	Industrial Strategy: Artificial Intelligence Sector Deal[24]	
Funding	£950 million from government, academia, and industry (US$1.24 billion)	
Overall Goal of AI Strategy	Promote collaboration between the government and private sector to make the UK a global centre for AI	
Policy Elements	Research	• Raise total R&D investment / Alan Turing Institute will expand to become the national AI research centre
	AI Talent	• Turing Fellowship programme to attract and retain AI talent / Government funded AI PhDs / Industry funded AI Masters
	Future of Work	• Investment in skills training, with a focus on STEM / Introduce a National Retraining Plan in Parliament
	Industrial Policy	• Attract foreign FDI in AI / provide investment funds for start ups / establish a co-financed investment fund
	Ethics	• New Centre for Data Ethics and Innovation
	Data & Digital Infrastructure	• Create data trusts / provide legal certainty over sharing and use of data / improve digital infrastructure
	AI in Government	• Alan Turing Institute's upcoming review of the application of AI to government / GovTech fund
	Inclusion	• Work with AI Council to promote the importance of a diverse research base and workforce in AI

24 https://www.gov.uk/government/publications/artificial–intelligence–sector–deal
   https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf