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Overview of AI Industry Development Worldwide



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US works to maintain global leadership in AI

In the US, artificial intelligence (AI) policies emphasize to advance its proactive and visionary AI development and maintain its global leadership in key AI sectors, such as chips, operating systems and other computer sectors as well as finance, military and energy sectors. The nation has released several AI plans since 2013. It was the first to propose applications of and visions for AI in arenas such as smart cities, city brain, autopilot and education. In 2016, the Obama administration elevated AI to a national strategy and offered policy, technology and fund support, so as to make investments in AI research, develop methods for human-AI collaboration, address legal, ethical, and societal implications of AI, develop shared public datasets to train and test AI, measure and evaluate AI technologies through standards and benchmarks. The Trump administration seeks to maintain the nation's leadership in AI, prepare American workforce for the job, promote public research and development (R&D), and break barriers to AI innovation. Furthermore, the Select Committee on Artificial Intelligence has been instituted to coordinate AI development. The US Department of Defense (DoD) has set up the Joint Artificial Intelligence Center (JAIC) to oversee the building of an intelligent military system. Earlier this year, the Trump administration declared to “maintain American leadership in

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artificial intelligence”. To that end, it would prioritize the development of AI technologies through reinforced policy support, legislative process at Congress and increased R&D spending in a bid to sustain American leadership position in this new era of AI. Based on the human-machine-environment system, the American AI Initiative (hereinafter referred to as the Initiative) takes on five key features, namely “investing in AI Research and Development (R&D)”, “unleashing AI resources”, “setting AI governance standards”, “building the AI workforce” and “seeking international engagement”. Following the Initiative, the DoD issued AI development regulations, and the Department of Commerce established the American Workforce Policy Advisory Board, indicating that government agencies in the US are gathering speed in AI.

 **Japan emphasizes human-centric AI**

Japan claims that the impact of AI on human potential, social systems, industrial structure, innovation systems and governments shall be taken into account when advancing AI technology R&D, and proposes to build an “AI-Ready Society” where AI can be used effectively and safely. Japan’s AI development “roadmap” outlines three key phases and seeks to greatly boost the efficiency of productivity, mobility, medical care and nursing services with AI. By vigorously developing AI, the nation attempts to maintain and expand its technological advantages in automobile and robotics sectors, gradually address social concerns, including aging population, labor shortage, medical care and elderly care, and steadily realize Society 5.0, a super-smart society. With regard to technology development, Japan gives priority to “AI technologies based on information and communication technology (with flexible use of big data)” and “AI technologies based on brain science”, while integrating the

Internet of Things (IoT) into AI technologies in the domain of information science.



China drives AI industry with applications

In China, the development of AI-related industries has become a national strategy. From the central government to local governments at all levels, earnest efforts are made with a top-down approach to develop AI industries with all-rounded guidance and planning. In view of top-level design, the nation makes comprehensive arrangements and pursues wide-ranging development of software and hardware, including mobile Internet, big data, supercomputing, sensor webs, brain science, autopilot and intelligent robots. With well-defined strategy and division of labor, China intends to overtake other players in the field. Focused on accelerating the deep integration of AI and economic and social development, China encourages expansive industry-university-research collaboration and works on the industrialization and integrated application of the new-generation AI technologies to integrate AI and the real economy in depth. At local levels, nearly 30 provinces, municipalities and areas, including Beijing, Shanghai, Guangdong, Jiangsu, Anhui and Zhejiang have issued AI planning, ensued by efforts to bring in AI talents and projects through holding AI-themed meetings, establishing local industrial alliances and building joint labs with famous universities, colleges, and enterprises. Meanwhile, they proactively promote AI applications in such fields as security protection, education, medical care, public security, procuratorate and court systems and smart cities.



EU is committed to building Trustworthy AI

The European Union (EU) holds that AI must be developed under fulsome

human oversight and control. Safe and trustworthy AI must be developed in the use of the technology, to ensure AI is aligned with the foundational values of respect for human rights, democracy and the rule of law . The EU actively examines “the perception of AI coming to replace workers” and “AI bias” as a result of AI development, and calls for efforts to study and develop AI ethics codes as well as appropriate ethics and legal frameworks. A total of 25 European countries signed “EU Declaration on Cooperation on Artificial Intelligence” in April 2018 to jointly deal with opportunities and challenges arising from AI development in society, economy, ethics and law. In December, the High-Level Expert Group on Artificial Intelligence (AI HLEG) set up by the European Commission issued the first draft of Ethics Guidelines for Trustworthy AI, a document governing the development and use of AI. It puts forward basic principles and requirements for trustworthy AI, methods to realize trustworthy AI and a trustworthy AI assessment list.



Germany develops AI through Industry 4.0

Germany has always been closely watching the influence of technology on economy and life and seeking extensive R&D commercialization. The nation’s AI strategy targets at “Artificial Narrow Intelligence” and seeks to secure breakthroughs in five aspects, namely automated theorem proving and automated reasoning, knowledge-based systems, pattern recognition and analysis, robotics and intelligent multimodal human-computer interaction. The nation also attaches great importance to small and medium-sized enterprises (SMEs). Apart from financial support, the government will also support SMEs regarding digital technology and business models, preparing them for the era of AI. In addition, the German government will also fund R&D and the transformation of innovation achievements into tangible products in key AI-related sectors, raise the

economic benefits of German AI experts, speed up the building of an AI competence center in concert with France, realize connectivity with the latter as soon as possible, set up specialized competence centers and ramp up AI infrastructure construction.

UK enhances overall strength via cutting-edge AI R&D innovation

Supported by solid cutting-edge R&D innovation, the British government promotes AI through supporting AI innovation and research, advancing AI applications, training and bringing in AI talents, improving data infrastructure, developing fair and safe data sharing frameworks and fostering a sound environment for start-ups, in a bid to keep its AI leadership. The UK is a highland of academic research on AI, given that local universities—the University of Oxford, the University of Cambridge, Imperial College London, and University College London (UCL)—and research institutes boast profound expertise in AI and machine learning.

France is catching up to institute an AI economic system

France, a potent latecomer only begun working on AI planning in 2017. French President Emmanuel Macron announced in March 2018 that the nation would invest 1.5 billion euros of public funds in AI by 2022 to put an end to brain drain and catch up with the US, China and other high-tech powers. The nation's AI strategy identifies four major aspects: strengthening French and EU AI ecosystems; implementing an open data policy; adjusting investment and legal frameworks of France and Europe; and fixing AI-related ethical matters and policy. It takes healthcare, transport, environment, and defense and security as four strategic sectors

of AI application. In addition, France puts a premium on AI industrial standardization systems in a bid to fuel European rejuvenation with France and Germany at the center through new AI-enabled standard systems and industrial systems in the continent.



Russia works hard on institutional setup in AI sector

Russia developed a national AI strategy in June to speed up investment and support on SME projects in AI, IoT, robots and big data. Previously, the Ministry of Defence (MOD) of Russia joined forces with the Ministry of Education and Science to draw up a 10-point plan for AI development, which seeks to stimulate AI development through building relevant organizations and institutions and developing overall planning. According to the plan, the nation is going to form an AI and big data consortium, develop a fund for analysis of algorithms and projects, institute a state AI training and education system, build an AI lab and a national AI center. At the same time, Russian MOD seeks to keep tabs on the R&D and development trends of AI by monitoring global AI dynamics. It also plans to conduct AI-based military exercises and discuss AI proposals in military forums.

Appendix: Overview of Major AI Policies Worldwide

Country	Strategy/plan	Issuer	Time of issue
US	National Artificial Intelligence Research and Development Strategic Plan	National Science and Technology Council (NSTC)/Networking and Information Technology Research and Development (NITRD) Program	October 2016 June 2019 Updated
	Preparing for the Future of Artificial Intelligence	Executive Office of the President/NSTC/Committee on Technology	October 2016
	Artificial Intelligence, Automation, and the Economy	Executive Office of the President	December 2016
	Summary of the 2018 White House Summit on Artificial Intelligence for American Industry	Office of Science and Technology Policy, White House	May 2018
	Executive Order on Maintaining American Leadership in Artificial Intelligence and American AI Initiative (Initiative)	White House	February 2019
EU	Human Brain Project	European Commission	2013
	Strategic Research Agenda for Robotics in Europe 2014-2020 (SPARC 2014-2020)	Future & Emerging Technologies Advisory Group (FETAG), European Commission	2014
	Artificial Intelligence for Europe	European Commission	April 2018
	Toward an EU strategy on automated vehicles: GEAR 2030	European Commission	May 2018
	Coordinated Plan on the Development and Use of Artificial Intelligence Made in Europe-2018	European Commission	December 2018
UK	Robotics and Artificial Intelligence	Science and Technology Committee, House of Commons	September 2016
	Growing the Artificial Intelligence Industry in the UK	Independent expert report/UK-based DCMS	October 2017
	Industrial Strategy—Building a Britain fit for the future	Government of the UK	November 2017
	AI in the UK: ready, willing and able?	Select Committee on Artificial Intelligence, House of Lords	April 2018
	Industrial Strategy—Artificial Intelligence Sector Deal	Government of the UK	April 2018
	Government response to the Lords Select Committee on Artificial Intelligence report	House of Lords	June 2018

Country	Strategy/plan	Issuer	Time of issue
Germany	Digital Strategy 2025	Federal Government of Germany	March 2016
	Key points for a Federal Government Strategy on Artificial Intelligence	Federal Government of Germany	July 2018
	Hightech-Strategie 2025 (HTS 2025)	Federal Government of Germany	September 2018
	Federal Government's Artificial Intelligence (AI) Strategy	Federal Ministry for Economic Affairs and Energy, Federal Ministry of Education and Research and Federal Ministry of Labour and Social Affairs	November 2018
Japan	New Robot Strategy	Ministry of Economy, Trade and Industry	February 2015
	5th Science and Technology Basic Plan	Cabinet Office, Government of Japan	January 2016
	Artificial Intelligence Technology Strategy	Strategic Council for AI Technology	March 2017
	White Paper on Manufacturing Industries (2018)	Ministry of Economy, Trade and Industry	May 2018
	Integrated Innovation Strategy (2018-2019)	Cabinet Office, Government of Japan	June 2018
	Implementation Plan for Artificial Intelligence Technology Strategy	Cabinet Office, Government of Japan	August 2018
France	French Intelligence Artificielle	Government of France	March 2017
	How can humans keep the upper hand? Report on the ethical matters raised by algorithms and artificial intelligence	Commission Nationale Informatique & Libertes (CNIL)	December 2017
	For a Meaningful Artificial Intelligence Towards a French and European Strategy	National Assembly of France	March 2018
	Artificial Intelligence: "Making France a leader"	President of France	March 2018

Country	Strategy/plan	Issuer	Time of issue
Russia	Strategy for the Scientific and Technological Development of the Russian Federation until 2025	Presidential Executive Office of Russia	December 2016
	10-point plan for AI development in Russia	Ministry of Defence of the Russian Federation	July 2017
	Digital Economy of the Russian Federation for 2017-2030	Ministry of Digital Development, Communications and Mass Media of the Russian Federation	July 2017
	National Artificial-Intelligence Strategy (draft for review) (unpublished)	Government of Russia	June 2019
Canada	Pan-Canadian Artificial Intelligence Strategy	Canadian Institute for Advanced Research (CIFAR)	March 2017
India	Report of Task Force on Artificial Intelligence	Department for Promotion of Industry and Internal Trade	March 2018
	National Strategy for Artificial Intelligence (report)	NITI Aayog, India	June 2018
South Korea	Mid-to Long-Term Master Plan in Preparation for the Intelligent Information Society	Ministry of Science, ICT and Future Planning (MSIP)	December 2016
	“Plan for the Fourth Industrial Revolution” to Promote Innovative Growth I-Korea 4.0	Presidential Committee on the Fourth Industrial Revolution	May 2018
	Plan for the development of data, artificial intelligence (AI) and hydrogen economy (three driving forces of innovation-driven development)	Ministry of Science and ICT	January 2019
Denmark	Denmark’s Digital Growth Strategy	Ministry of Industry, Business and Financial Affairs	January 2018
	Ready to seize future opportunities	Ministry of Higher Education and Science	April 2018
	Research 2025: Danish Priorities	Ministry of Higher Education and Science	June 2018
	Danish National Strategy for Artificial Intelligence	Government of Denmark	March 2019

Country	Strategy/plan	Issuer	Time of issue
Finland	Finland's Age of Artificial Intelligence	Ministry of Economic Affairs and Employment of Finland	October 2017
	Work in the age of artificial intelligence	Ministry of Economic Affairs and Employment of Finland	June 2018
New Zealand	Artificial Intelligence: Shaping a Future New Zealand	AI forum	March 2018
Singapore	AI Singapore	National Research Foundation (NRF), Singapore	May 2017
United Arab Emirates (UAE)	UAE Strategy for Artificial Intelligence	UAE	October 2017
	National Artificial Intelligence Strategy 2031	UAE	April 2019
Italy	Artificial Intelligence at the service of the citizen	Agency for Digital Italy and Ministry of Public Administration	March 2018
Sweden	Artificial intelligence in Swedish business and society	Vinnova	May 2018
Spain	Spanish RDI Strategy in Artificial Intelligence	Government of Spain	March 2019
The Netherlands	First draft of Dutch national AI strategy (unpublished)	Public-private partnership AINED	April 2019
Vietnam	"Decision to Implement 'Plan for 2025 Artificial Intelligence Research and Development'"	Ministry of Science and Technology	October 2018

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