Value and Impact through Synergy, Interaction and coOperation of Networks of AI Excellence Centres

GRANT AGREEMENT NUMBER: 952070

Deliverable D6.2

International Outreach Report

Project title	**VISION**
Grant Agreement number	**952070**
Funding scheme	**Horizon 2020**
Start date of the project and duration	**1 September 2020, 36 months**
Project coordinator name	**ULEI - UNIVERSITEIT LEIDEN – Holger Hoos**
Deliverable number	**D6.2**
Title of the deliverable	**International Outreach Report**
WP contributing to the deliverable	**WP6**
Deliverable type	**Report**
Dissemination level	**Public**
Due submission date	**Initial Analysis anticipated at M24 (31 Aug 2022)**
Actual submission date	**11 November 2022**
Partner(s)/Author(s)	**Irene Facchin (FBK), Matteo Gerosa (FBK)**
Internal reviewers	**Completed**
Final approval (Executive Board)	**Completed**

Disclaimer

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 952070. This document has been prepared for the European Commission, however, it reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein

History of changes		
When	**Who**	**Comments**
18/08/2022	Irene Facchin (FBK)	First draft prepared
11/11/2022	Irene Facchin (FBK)	Document finalized

Confidentiality	
Does this report contain **confidential** information?	Yes ☐ No X
Is the report **restricted** to a specific group?	Yes ☐ No X *If yes, please precise the list of authorised recipients*:

Table of Contents

Executive Summary

Foreseen as the outcome of T6.2 International outreach, this deliverable “International Outreach Report” (D6.2) is the first draft and present an analysis of how AI is perceived in some key countries and who are the main players. Starting from an overview of some of the National strategies and approaches for AI (see below), a breakdown has been presented of some of the main AI network / Alliances outside Europe. Additionally, it has been analysed some of the main players in the field of AI and which are the main conferences of the sector. A final chapter is devoted to an overview of the costs and benefits analysis of an outreach effort.

As foreseen in the proposal, a more complete and detailed analysis will be presented in the final version of the document (foreseen for M36), together with a report of the activities carried out on this matter related to the promotion of international standards, the exchange among the research community, and the organisation of news coverage outside the EU.

1. Introduction

According to OECD and its worldwide live repository of AI policy initiatives[1], many countries in the world are investing in research & development in Artificial Intelligence. The aims being to harness benefits and mitigating risks, to develop standards and AI policies, to ensure international cooperation, etc. By taking a look at the analysis carried out by the European Commission/OECD, the national AI policies and strategies analysed can be divided in four main areas, i.e., a) Governance (including National strategies, and plans, and an analysis of how AI is used in the public sector); b) Financial support (intended as project grants, financing for business R&D and innovation, and procurement programs for R&D and AI innovation; c) AI enablers and other incentives (including but not limited to networking and collaborative platforms, data access and sharing, and AI computing and research infrastructure); and d) Guidance and regulation and standards in the field of AI[2].

2. National strategies and approaches for AI

Countries in the world are at different stages of the development and implementation of national AI strategies and policies. Canada developed its national AI strategy already in 2017, closely followed in 2018 by Japan, France, Germany and the United Kingdom. Other countries are currently still defining or planning their strategy.

In Europe, the AI Watch has issued a report in 2021 presenting the AI strategies of EU Member States plus Norway. As can be appreciated in the table below, only seven countries had yet to publish their national strategy on Artificial Intelligence at the survey date.

Country	Status	Date	Country	Status	Date
Austria	In progress		Italy	In progress	
Belgium	In progress		Latvia	Published	Feb. 2020
Bulgaria	Published	Dec. 2020	Lithuania	Published	Mar. 2019
Croatia	In progress		Luxembourg	Published	May 2019
Cyprus	Published Last update	Jan. 2020 Jun. 2020	Malta	Published	Oct. 2019
Czech Republic	Published	May 2019	Netherlands	Published	Oct. 2019
Denmark	Published	Mar. 2019	Norway [AC]	Published	Jan. 2020
Estonia	Published	Jul. 2019	**Poland**	Published	Dec. 2020
Finland	Published Last update	Oct. 2017 Nov. 2020	Portugal	Published	Jun. 2019
France	Published	Mar. 2018	Romania	In progress	
Germany	Published Last update	Nov. 2018 Dec. 2020	Slovakia	Published	Jul. 2019
Greece	In progress		**Slovenia**	Published	May 2021
Hungary	Published	Sept. 2020	**Spain**	Published	Dec. 2020
Ireland	In progress		Sweden	Published	May 2018

Source: JRC – European Commission
Note: Last update of the table on the 1st of June 2021. The information in the table is based on input from national contact points or public sources. It present release dates of national AI strategies in their native language. Countries in bold have published or updated their national AI strategy since the release of the previous AI Watch report in February 2020. In addition to EU Member States, this table also includes Norway as Associated Country highlighted with the superscript [AC]. Switzerland does not intend to release a national AI strategy.

Tab. 1 – Overview of national AI strategies in the EU Member States and Norway.[3]

Worldwide, this is the situation:

[1] https://oecd.ai/en/dashboards
[2] https://oecd.ai/en/dashboards
[3] https://eaca.eu/news/national-ai-strategies-in-europe/

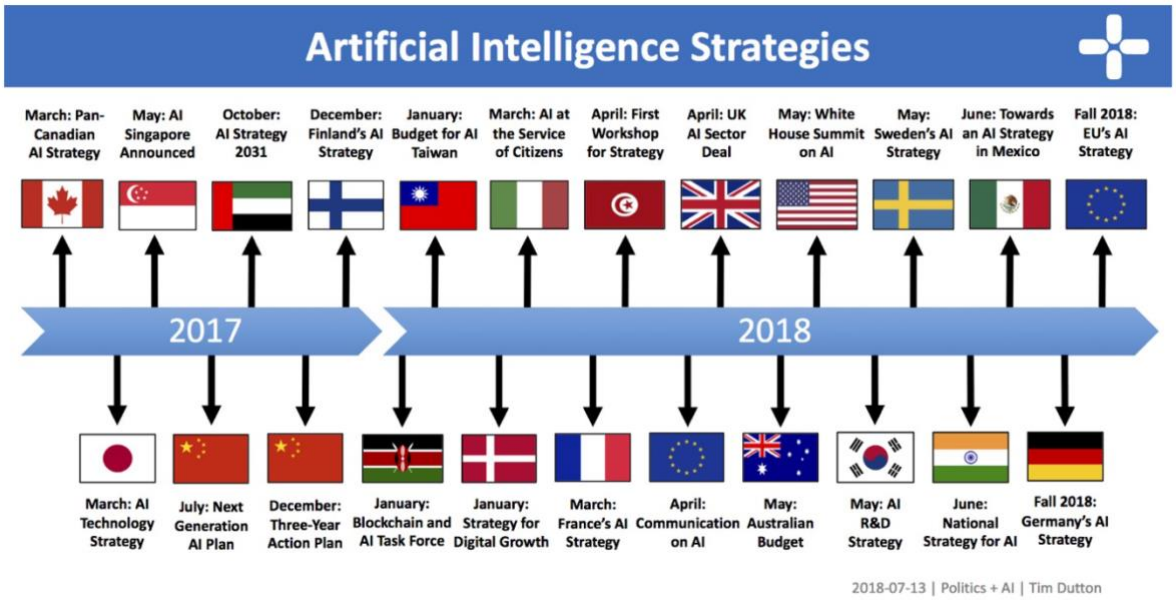


Fig. 1 – AI strategies in the world[4].

Many strategies are adopted so as to implement policies, the most frequent and more widely used being:

1. **Investing in research & development on AI** to "*support the establishment of national AI research institutes; consolidate AI research networks and collaborative platforms; prioritise AI investments in targeted sectors; pursue AI mission-oriented innovation policies; and procure AI systems for the public sector.*"[5]
2. **Data access and sharing** with the aim to hasten the country acceptance of AI.
3. **AI Infrastructures and technologies**, in particular the need for high-quality connectivity and 5G technology and networks.
4. **Shaping an enabling environment to support AI commercialisation or deployment** by a) offering controlled environments for experimentation and testing and access to funding; b) establishing networking and collaborative platforms to put into connection companies and business opportunities; c) providing tailored advisory.
5. **AI skills, jobs and labour market transformation** to confront the new challenges that AI will create in the labour market.

Following is an overview of some key countries national AI strategies. As can be appreciated below, the main aim of all the countries is to improve the national presence in the AI field, that is perceived as a resourceful sector in expansion.

[4] https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd
[5] https://goingdigital.oecd.org/data/notes/No14_ToolkitNote_AIStrategies.pdf, page 9.

UK

The UK developed its own national AI strategy in 2021[6] following Brexit, in which it acknowledged the role of AI in increasing resilience, productivity, growth and innovation. The UK plan in ten years is to make the country a global centre for AI innovation, and in view of this near £1 billion has been allocated to increase its role as leader in developing AI technologies. The main aims of the UK plan is to:

a) invest and plan for the long-term needs of the AI ecosystem;

b) support the transition to an AI-enabled economy, thus ensuring the most of AI benefits;

c) encourage innovation and investment; and

d) protect the public.

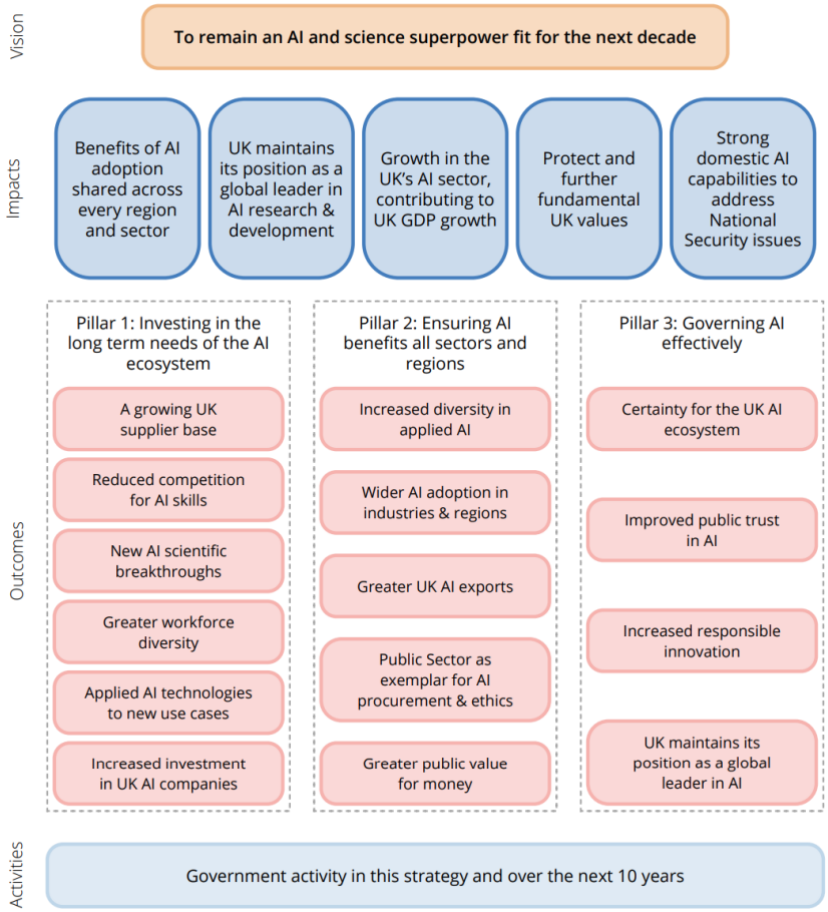


Fig. 2 – UK's National AI strategy[7].

[6] https://www.gov.uk/government/publications/national-ai-strategy

[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1020402/National_AI_Strategy_-_PDF_version.pdf

The UK's National AI strategy is based on 3 pillars:

1. **Investing in the long-term needs of the AI ecosystem**, to be achieved through a) a new National AI Research and Innovation Programme to align research and stimulate new investment; b) a policy framework and a report on the UK's compute capacity needs to support AI innovation; c) the development of a varied and talented workforce; d) an evaluation of the valuable datasets and of the state of funding specifically for innovative firms; e) the protection of national security through the National Security & Investment Act while keeping the UK open for business with the rest of the world; f) the inclusion of provisions on emerging digital technologies, including AI, in future trade deals.

2. **Ensuring AI benefits all sectors and regions**, to be achieved through a) a programme as part of UKRI's National AI R&I Programme to stimulate the development and adoption of AI technologies; b) a draft National Strategy for AI in Health and Social Care in line with the National AI Strategy; c) build an open repository of AI challenges with real-world applications; d) publish research into the factors impacting the diffusion of AI; e) publish the Ministry of Defence AI Strategy.

3. **Governing AI effectively**, to be achieved through a) developing a national position on AI to be published in a White Paper; b) publishing the CDEI assurance roadmap; c) piloting an AI Standards Hub to coordinate UK engagement in AI standardisation globally and to guide AI ethics and safety in the public sector.

USA

In 2021 in the USA, the National AI Initiative Act provided a coordinated program to hasten research in the field of AI[8]. The main pillar of the program are:

- **Innovation**
  America has decades-long investments in R&D in all sectors of AI that have contributed to produce cutting-edge technologies. R&D investments are guided by the **National AI R&D Strategic Plan: 2019 Update** in which the six areas of strategic AI R&D that require investments are identified, also giving priorities to them. An overview of the investments in AI R&D in the period 2016-2019 is provided in this report.
  To make it easier to researchers, the ones from which the ideas start, to detect resources and funding programs available, the **AI Researchers Portal** has been established.
  Additionally, an investment of $360 million over five years has been allocated to the new **National AI Research Institutes** that has the aim to create collaboration hubs across academia, industry, and government to advance AI and increase research.

- **Advancing trustworthy AI**
  One of the aims of the National AI initiative is that the United States become a worldwide leader in the use of trustworthy AI systems, i.e., ethical, fair, with reduced bias and that protect privacy, which are essential to ensure a positive effect of AI on society. To achieve this, research is fundamental and that is why there are many Federal R&D programs with the aim to "address the ethical, legal, and societal implications of AI, as well as the safety and security of AI systems"[9].

[8] https://www.ai.gov/#:~:text=The%20National%20AI%20Initiative%20Act,economic%20prosperity%20and%20national%20security.

[9] https://www.ai.gov/strategic-pillars/advancing-trustworthy-ai/

Defining metrics, assessment tools, and technical standards is also fundamental, above all in the public sector, and this work is carried out by the **National Institute of Standards and Technology (NIST)**, which also develop a risk management framework for trustworthy AI and guidelines for AI applications[10].
Trustworthy AI has many challenges and opportunities. To better appreciate them, the involvement of stakeholders and the public is critical.

- **Education and training**
  AI will impact the workforce, creating both challenges and benefits (new occupations, increased innovation and productivity, reduced repetitive tasks, etc.). Education is vital to be sure that workers are prepared for these changes. In 2018 the **Federal 5-Year STEM Education Strategic Plan** has been released, together with at least $200 million in grant funds per year to the promotion of high-quality computer science and STEM education. However, to cover the actual AI talent gap, Federal R&D Agencies are secondary fellowship and scholarship programs in AI.

- **Infrastructure**
  "Advances in AI continue to be dependent on broad access to high quality data, models, and computational infrastructure."[11] To ensure this, the **National AI Research Resource (NAIRR)** is being established, a shared computing and data infrastructure to provide researchers with access to high-quality data and compute resources, as well as directing the Federal agencies to provide the best data sets for AI R&D.
  Additionally, the availability of developed high-performance computing (HPC) infrastructures for AI, of which the US is leader, is equally important (i.e., the **Frontier supercomputer** and the **Summit supercomputer**); as well as the presence of agile, reliable, and scalable computing capabilities provided by robust Cloud platforms.

- **Applications**
  All these efforts in contributing to R&D and use of AI in a wide range of applications both in the public and private sectors and in many different domains[12]:
  - Agriculture: 4 AI research institutes has been funded to advance AI role;
  - Financial services: AI to enable people to make more informed decisions;
  - Healthcare and the COVID-19 pandemic response;
  - Science;
  - Transportation;
  - National security and defence with the establishment of the **Joint Artificial Intelligence Center** (JAIC).

- **International cooperation**
  An international environment provide boost and support to AI R&D by offering different perspectives and a multi-stakeholder engagement. This is achieved through, i.e., the **Organization for Economic Cooperation and Development (OECD),** and the **Global Partnership on AI** (GPAI). The former has outlined the **OECD Recommendation on AI** for the definition of common AI principle to be followed internationally and an **AI Policy Observatory** for facilitating dialogue and cooperation. The latter, launched in 2020, brings together expertise from different sectors for bridging the gap between theory and practice of AI.

[10] https://www.whitehouse.gov/wp-content/uploads/2020/11/M-21-06.pdf
[11] https://www.ai.gov/strategic-pillars/infrastructure/
[12] https://www.ai.gov/strategic-pillars/applications/

China

China's AI Plan for 2030 has as goal to embed AI in all aspects of life so as to become an AI power, starting from the assumption that AI technology is a critical aspect for both China's military and economic position[13]. The plan is envisaged in three steps: a) make the AI industry of China competitive by 2020, as well as to optimise an ecosystem for AI development and "establish initial ethical norms, policies, and regulations"[14]; b) by 2025, the objective is for China to become leader in some sectors, therefore achieving a "major breakthrough" in AI and the definition of ethical standards for AI to be received from the central government; c) become the leader of AI innovation by 2030, thus developing into the world' innovation centre for AI. And it is comprehensive of initiatives for R&D, industrialisation, education, standard setting, ethical norms, and security.

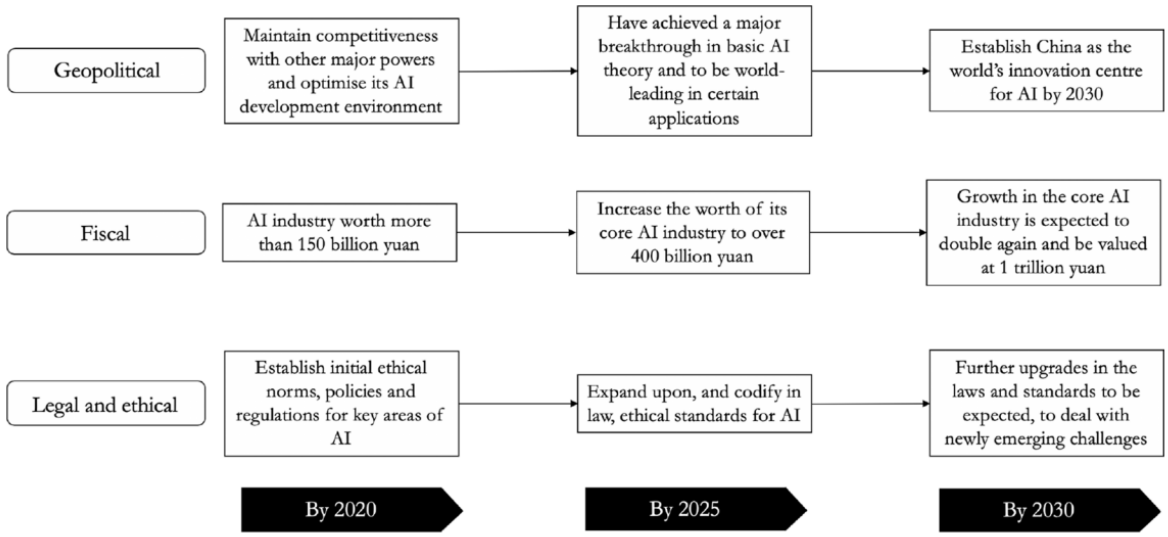


Fig. 3 – China's New generation artificial intelligence development plan (AIDP)[15].

China's AI industry is rapidly developing, with a market that was of more than 128 billion RMB in 2020. By 2030, it is expected that AI industry will be valued at 1 trillion yuan (around 147 billion dollars). The investment from the Chinese government will be of around 1 trillion RMB (around 143 million EUR).[16]

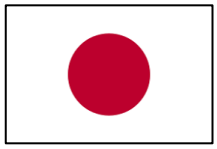
[13] https://www.theconstructsim.com/98-chinas-ai-plan-for-2030/#:~:text=In%20this%20strategic%20document%2C%20China's,of%20life%2C%20industry%20and%20commerce.

[14] https://www.researchgate.net/publication/342246048_The_Chinese_approach_to_artificial_intelligence_an_analysis_of_policy_ethics_and_regulation/citation/download, page 2.

[15] https://www.researchgate.net/publication/342246048_The_Chinese_approach_to_artificial_intelligence_an_analysis_of_policy_ethics_and_regulation/citation/download.

[16] https://www.dx2025.com/wp-content/uploads/2021/06/chinas_new_generation_of_artificial_intelligence_technology.pdf

Japan



Japan AI ecosystem is flourishing, with investments coming from both the public (the Japanese government) and the private sector (Council for Science, Technology and Innovation and the Strategic Council for AI Technology)[17]. Japan plans AI to be embedded in its vision of the society of the future, named Society 5.0, defined as "A human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space."[18]

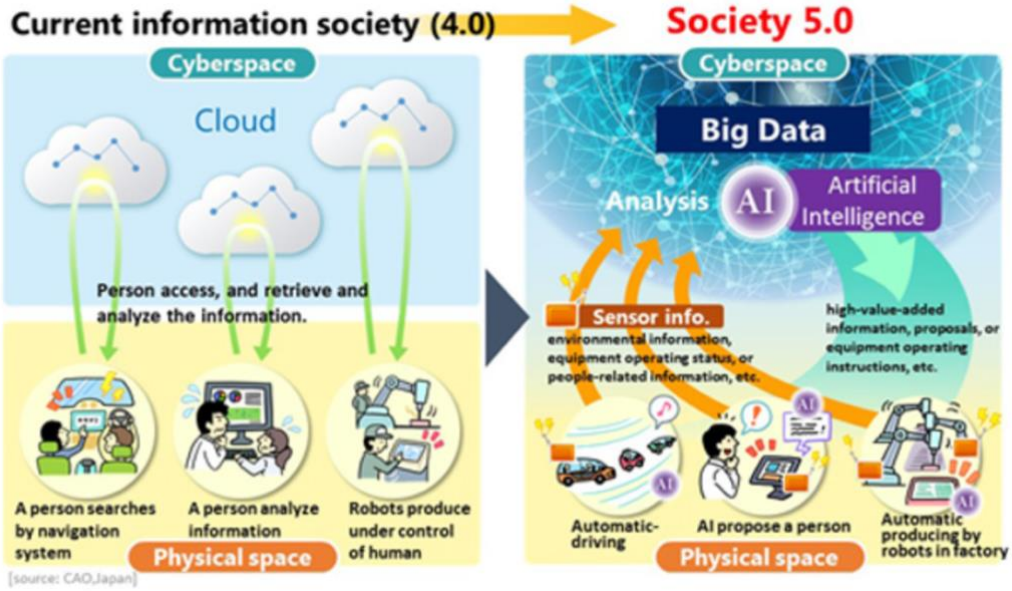


Fig. 4 – Japan' Society 5.0.

The Japanese 2022's **AI strategy**[19] outlines an action plan in line with **five strategic objectives** focused on:

- **Education**, to develop human resources for the AI era and attract talent worldwide.
- **Industrial competitiveness**: become the forerunner in AI applications in real-world industries.
- **Sustainability**: establish a set of technical systems to achieve a sustainable society.
- **International cooperation** for research, training, and social infrastructure network in AI.

All this has to be achieved through the social principles of AI, i.e., security, fairness, accountability, transparency, innovation, fair competition, privacy protection, and education.

[17] https://www.rvo.nl/sites/default/files/2020/12/Artificial-Intelligence-in-Japan-final-IAN.pdf

[18] https://www8.cao.go.jp/cstp/english/society5_0/index.html#:~:text=What%20is%20Society%205.0%3F,integrates%20cyberspace%20and%20physical%20space.%22

[19] https://practiceguides.chambers.com/practice-guides/artificial-intelligence-2022/japan/trends-and-developments

Canada

Canada was the first country to adopt a national AI strategy in 2017, in partnership with CIFAR, with a vision of having one of the most robust national AI ecosystems by 2030. The **Pan-Canadian Artificial Intelligence Strategy** is based on 3 pillars: commercialisation, standards, and talent and research.

COMMERCIALIZATION	STANDARDS	TALENT & RESEARCH
• **National AI Institutes (Amii, Mila, Vector Institute)** to a) translate research into commercial applications, and b) raise these new technologies' adoption **Financial support: $60 million in 2021 + $20 million each institute over 5 years** • **Canada's Global Innovation Clusters** to promote the adoption of Canadian AI technologies **Financial support: $125 million over 5 years (from 2021)**	• Efforts are devoted to advance development and adoption of AI standards, through the **Standards Council of Canada** **Financial support:** $8.6 million over 5 years (from 2021)	• **CIFAR**, a global research organisation, to enhance programs to attract, maintain and foster academic research talent. **Financial support:** $208 million over 10 years (from 2021) • The **Digital Research Alliance of Canada**, a non-profit organization funded by the Canadian government, to support the strategy objectives by providing computing capacity for AI researchers. **Financial support:** $40 million over 5 years (from 2021)

Additionally, other initiatives on AI are:

- **Advisory Council on Artificial Intelligence,** to provide advice to Canadian government on how to build Canada's global leadership in AI.
- **Global Partnership on Artificial Intelligence (GPAI),** of which Canada is a founding member, to ensure the responsible development and use of AI.
- **Responsible Artificial Intelligence** in Government to enable the responsible use of AI in government programs and services.

After a commitment of around $443 million in 2021, the Canadian government has confirmed its pledge of investing all efforts to drive the adoption of AI in all sectors by defining a second phase of the pan-canadian AI strategy[20]. The second phase will bond Canada's world-class talent and research

[20] https://www.canada.ca/en/innovation-science-economic-development/news/2022/06/government-of-canada-launches-second-phase-of-the-pan-canadian-artificial-intelligence-strategy.html

capacity with programs with the final aim to enable commercialization and adoption of Canadian ideas and knowledge.

Republic of Korea

AI has been considered a powerful solution to both increase a country industrial productivity. In 2019, Korea announced its **National Strategy for AI** and made it a key element of its **Digital New Deal Initiative**.

As it can appreciated in Fig. 5, Korean National Strategy for AI is based on the vision of making AI available to all citizens and for all the society sectors. Below, an overview of Korea's goals.

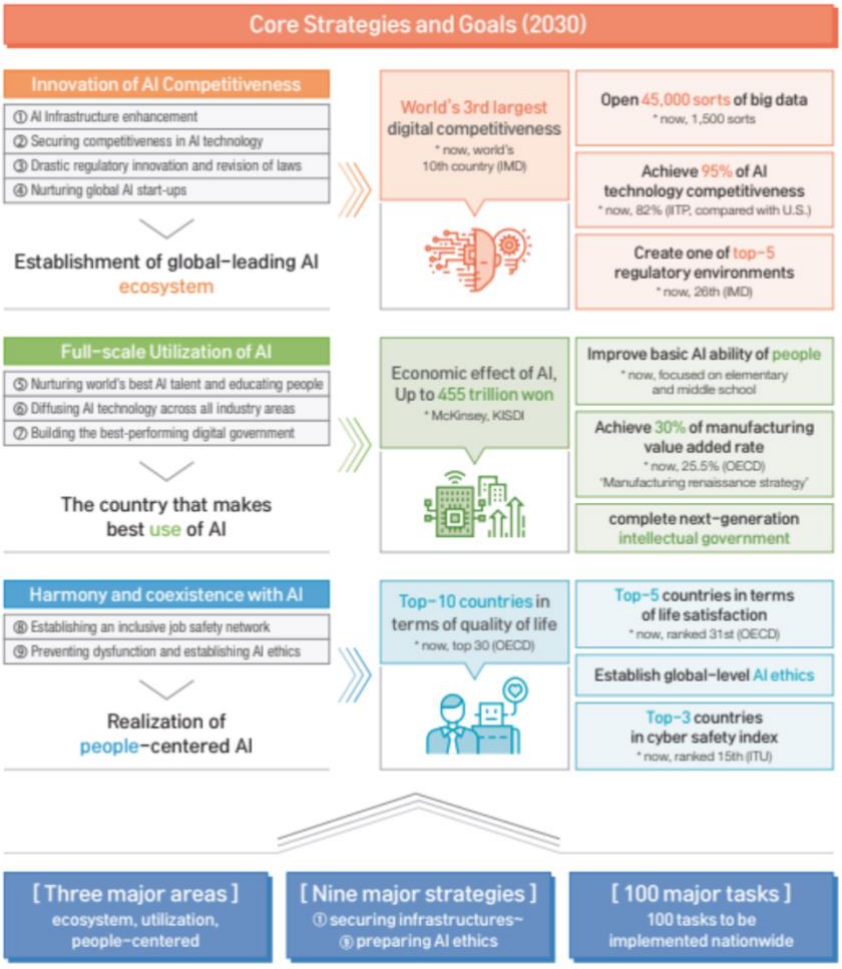


Fig. 5 – Korea vision for AI.[21]

21 https://doc.msit.go.kr/SynapDocViewServer/viewer/doc.html?key=7e7471c152414f03b9466ccb9e8d51d9&convType=img&convLocale=ko_KR&contextPath=/SynapDocViewServer

The aim of the **Digital New Deal** is to support the nation in its efforts to recover from the pandemic crisis through a strategy based on D.N.A., where D stands for Digital, N for Network, and A, of course, for Artificial Intelligence. Four sectors will benefit from the strategy, namely:

a) industrial sector: accelerate the industrial digitalisation by promoting the collection, sharing and use of big data, the use of 5G-based services, AI-based government services, as well as the establishment of a Korean cybersecurity system;

b) education sector: the aim is to digitalise the education infrastructure and to expand it to the entire education system, also improving online learning environments, with Wifi and high-speed networks;

c) social and health sector, through the establishment of smart healthcare and caregiving infrastructures, the promotion of remote working, and the support to online business to micro-entreprises ; and

d) smart cities sector: digitalisation of urban areas and industrial complexes through the use of smart city solutions and establishing a smart logistics system.

For this, Korea plans to invest 160 trillion won to create more almost 2 million new jobs by 2025, as well as to strengthen employment and social safety. In the meantime, Korea has already reached some results: the integration of AI and 5G into the industry and the availability of online vouchers for the digital transformation of enterprises has transformed factories into smart factories that grew from 12K of 2019 to 20K of 2020.[22]

3. Main AI networks / alliance outside Europe

Since its establishing in 2018, the **European AI Alliance**[23] has worked to launch an open dialogue on AI with stakeholders such as citizens, business, academia, public authorities and experts in regular events and online form exchanges. Located under the umbrella of the **European AI strategy**, this community has the aims to promote the concept of trustworthy AI, and to build an ecosystem of Excellence and Trust in AI (through the publishing of a White paper).

Outside Europe, there are other networks/Alliances related to AI. In general, the approach seen is devoted to provide members an exchange place to discuss topics related to AI and exchange ideas between sectors and also internationally; support the R&D and product development in the field of AI; accelerate the adoption of trusted, inclusive, and responsible AI; and offer participation to conferences, seminars, workshops, etc.

US

edge ai + vision ALLIANCE
Formerly the Embedded Vision Alliance

[22] https://digital.go.kr/resources/UPLOAD//2021/08/03/129/6847124e-b11b-43e3-9024-f733ac8e7243.png
[23] https://digital-strategy.ec.europa.eu/en/policies/european-ai-alliance

In the US, the **EDGE AI and VISION ALLIANCE** is an industrial partnership that gather a wide range of technology providers (such as Intel or Siemens) and end-product companies (such as Nvidia) to hasten AI and vision's adoption. This mission is achieved by providing end-product companies support to achieve success through the use of AI and vision technologies, as well as inspiring them to incorporate these technologies into their products. But the Alliance support does not end here. What is offered is increased visibility to the company and early insight into new markets and technologies, the participation to the *Embedded Vision Summit conference* and other networking events. Additionally, a program is offered to enable companies to bring their innovative products faster on the market (the Vision Accelerator Program).

China

As already analysed above, China has put great effort in AI and to put it at the heart of China's industrial development. This strategy has brought to the creation of some *Artificial Intelligence Industry Alliances* that gather and foster collaboration among government, academia, and companies and promote collaborative innovation in AI. Usually funded and financially supported by the government, industrial Alliances are used to "support strategic emerging industries, encourage basic research and development, and set common goals to solve national problems".[24] The establishment starting from 2017, the number of industry alliances in the AI sector in China has reached 190 in 2019.[25]

One notable example of these Alliances is the **Artificial Intelligence Industry Alliance (AIIA)** [中国 人工智能产业发展联盟]. The main aim is to "build a platform for cooperation between governments (21 entities), industry (511 members), universities (31 members), research institutions, and end users […] and promote industrial cooperation and innovation."[26] The support given to the members (567 in May 2021) is related to their AI development and participation to conferences and workshops (40 conferences organised in 2019), as well as AI talent training programs. The Alliance's 10 working groups collect input from public and private partners and publish white papers.

Japan

Established in 1986, the **Japanese Society for Artificial Intelligence (JSAI)** contributes to the progress and development of science and industry in the AI field offering a network of exchanges between members and the academic research world and contributing to the R&D of AI through many international activities, such as a) the bi-monthly *Journal of JSAI* and the Transactions of JSAI on J-stage; b) annual international conference; c) special interest groups and seminars; d) exchanges with overseas academic societies. JSAI offers its 5K+ members not only all the Journal issues and the possibility to participate and make presentation at the Annual conference, but also the possibility to

[24] https://cset.georgetown.edu/wp-content/uploads/CSET-Chinas-Artificial-Intelligence-Industry-Alliance-1.pdf
[25] There were 83 industry alliances in 2017, 117 in 2018 and 190 in 2019; June 24, 2020, http://www.nkear.com/UploadedFiles/file/2020%E4%B8%AD%E5%9B%BD%E6%96%B0%E4%B8%80%E4%BB%A3%E4%BA%BA%E5%B7%A5%E6%99%BA%E8%83%BD%E7%A7%91%E6%8A%80%E4%BA%A7%E4%B8%9A%E5%8F%91%E5%B1%95%E6%8A%A5%E5%91%8A_.pdf (archived at https://perma.cc/GZ5V-6SWG).
[26] https://cset.georgetown.edu/wp-content/uploads/CSET-Chinas-Artificial-Intelligence-Industry-Alliance-1.pdf page 6.

participate in other international events. “Recently, JSAI has presented a draft ethics guideline for AI researchers, which touches on how research in the AI field should be carried out.”[27]

Canada

The **Ottawa Artificial Intelligence Alliance** is a scientific society for researchers on AI and machine learning, whose vision is of “building and strengthening a diverse, inclusive and impactful AI community in Ottawa”.[28] The aim of the Alliance is to raise awareness of the research on AI to the Canadian public, industry and academia and creating an AI community; to work as a networking platform to discuss AI applications in the real world; and organise an annual workshop.

The AI Impact Alliance aims to facilitate the employ of AI in an ethical and responsible way. The members of the Alliance combine different expertise and perspectives for an ethical use of AI. The Alliance provides analysis of regulatory frameworks, delivers programs for responsible AI strategies, assists members in finding data strategies and AI solutions to increase social impact, and creates tools to facilitate dialogue and build trust in AI.

An annual conference, ***AI on a Social Mission***, is organised to gather scientists, researchers, companies, decision-makers and innovators to explore the most recent AI technologies.

4. Main players

In 2021, the global AI market has been valued at 93.5 billion USD[29]. The projections are encouraging, with a CAGR of 38,1% in the period 2022-2030, and a whooping 136,6 billion USD in 2022, also encouraged by the continuous research and development in the sector. In addition, the machine learning and deep learning segment of the market is accounted for a revenue share of around 37% in 2021 and is subject of significant investments. Additionally, we witness the rising deployment of cloud-based computer platforms.

The main companies investing in AI, according to Globaldata, U.S. News, and Datamation, are:

Amazon.com has built AI into its ecommerce business and Amazon Web Services.

Considered as the leader in cloud computing, AWS offers a variety of both consumer and business-oriented AI products and services, such as:

- **Amazon Echo**, to bring AI into the home through **Alexa**
- **Lex**, a business version of Alexa
- **Polly**, to turn text into speech

[27] https://www.eubusinessinjapan.eu/sites/default/files/artificial_intelligence_in_japan.pdf
[28] https://sites.google.com/view/ottawaaialliance/home
[29] Source: https://www.grandviewresearch.com/industry-analysis/artificial-intelligence-ai-market

- **Rekognition**, an image recognition service.

Alphabet Inc. is one of the leaders in the AI sector related to retail banking and lending. It is basically a collection of different companies, the largest of which is Google. Alphabet Inc. will be going to switch with Google as the publicly traded entity.

In addition to using AI to improve its services, **Google Cloud** sells several AI and machine learning services to businesses. Additionally, Google has **TensorFlow**, an industry-leading software project and its own **Tensor AI** chip project.

DBS Bank, based on Singapore, is devoted to invest in the so-called "intelligent banking", using its bulk of data to build models of hyper-personalised messages to the users. DBS Bank has therefore been able to differentiate and doubling the number of transactions.

The pharmaceutical company **Novartis** has contributed to the digitalisation of the pharmaceutical sector, a process hastened by the Covid-19 pandemic. Their clinical trials are supervised online, and there are AI algorithms identifying skin conditions from images and chatbots to support patients dealing with heart problems.

Johnson & Johnson has greatly invested in robotics and automation, and this allowed them to continue to grow despite the Covid-19 pandemic.

Unilever, "a global company with a global purpose", has an HR platform "that uses a combination of in-browser games, natural language processing and machine learning to identify the best candidates to move forward"[30].

Firmenich SA is a private Swiss company in the fragrance and flavour business. They research taste and smell until to develop new technologies and manufacturing processes.

AI is also used to check food quality, as in the case of **Domino's** that uses AI to check the quality of its pizzas, thus improving it of about 15%. Additionally, they use AI to make predictions of when the order will be delivered, thus increasing customer experience.

LVMH uses AI to make a better user experience for those buying online luxury brands.

[30] https://www.retailbankerinternational.com/analysis/12-companies-leading-the-way-in-ai/

The Covid-19 pandemic has forced supply chains to rethink their business strategies. To do so, AI, Big Data, and machine learning are more essential than ever. **Home Depot** is using AI to provide customers products more suited to each budget and offer new features (ex. Image-based search facilities)[31].

Leidos, whose motto is *making the world safer, healthier, and more efficient*, is "testing the limits of AI on Sea Hunter, a new type of warship that replaces the crew with an algorithm."[32]

Shell is using AI to make its processes of the oil and gas supply chain smoother (ex. By using AI algorithms to help make drilling more precise, faster and with reduced damage to the equipment). According to Shell itself, "from machine learning to computer vision, deep learning to virtual assistants and autonomous vehicles to robotics, Shell has been focused on a range of technologies that have supported advances in AI."[33]

Nvidia Corp. produces both hardware and software, and in particular CPUs and graphics processing units. According to Nvidia themselves, "Our work in AI and computer graphics is transforming industries valued at more than $100 trillion, from gaming to healthcare to transportation, and profoundly impacting society"[34]. Nvidia is currently developing Eos, the world's fastest AI supercomputer.

Palantir Technologies Inc. is a company specialised in security and defence AI technologies. "We build software that empowers organizations to effectively integrate their data, decisions, and operations"[35].

Meta Platforms Inc. is an American technology multinational owning, among others, Facebook, Instagram, and Whatsapp. Machine learning, a basis of Facebook business model with algorithms to connect people and interests, is now exploited more and more by Meta, such as the possibility to translate 200+ languages with 44% more accuracy.

[31] https://www.forbes.com/sites/cognitiveworld/2020/10/17/how-home-depot-is-enhancing-the-ecommerce-experience-with-ai/?sh=f9400fa24455
[32] https://www.retailbankerinternational.com/analysis/12-companies-leading-the-way-in-ai/
[33] https://www.shell.com/energy-and-innovation/digitalisation/digital-technologies/shell-ai.html
[34] https://www.nvidia.com/en-us/about-nvidia/
[35] https://www.palantir.com/

"**Microsoft** AI has the potential to enable anybody to use, develop, and innovate with artificial intelligence in meaningful and relevant ways"[36]. It offers a mix of consumer-facing and business/IT AI projects and is going deeper into the AI sphere through its cloud computing program. The **Azure cloud service** sells AI services such as bot services, machine learning, and cognitive services to corporations, becoming a global leader in cloud computing and software development.

IBM (International Business Machines Corp.) has been at the vanguard for the development of data storage and computing technologies.

IBM Watson, an AI-based cognitive service, AI software as a service, and scale-out systems designed for delivering cloud-based analytics and AI services, aims to revolutionise how AI is used as part of business everyday operations. It can even operate together with Azure and AWS.

Alibaba Cloud is the leading cloud platform in Asia and offers a sophisticated machine learning platform for AI to optimise the supply chain, and to provide customers a personalised experience. Additionally, Alibaba provides cloud-based AI to be used by all and an AI chip available through the Cloud. Alibaba also have seven different research labs to focus on AI, machine learning, natural language processing, and network security.

The Japanese **Toshiba** manufactures various products, among which information technology and communication equipment, electronic components, power systems, consumer electronics and household appliances. Toshiba has also developed a "a new analytics system based on AI for use at its mainstay flash memory plant in Japan"[37].

5. Main AI conferences

Worldwide there are many AI conferences available. Herewith we are presenting the top conferences per relevance, according to AMAI.

The **International Joint Conferences on Artificial Intelligence Organization (IJCAI)** is organized by the International Joint Conferences on Artificial Intelligence, a non-profit corporation founded in California for scientific and educational purposes on Artificial Intelligence. IJCAI conferences present premier international gatherings of AI researchers and practitioners. The 2023 edition will be held in Cape Town, South Africa.

[36] https://www.greyb.com/artificial-intelligence-companies/
[37] https://www.eubusinessinjapan.eu/sites/default/files/artificial_intelligence_in_japan.pdf

The AAAI Conference on Artificial Intelligence has the aim to promote research in the field of AI and to promote discussion between researchers and experts.

The International Conference on Learning Representations (ICLR) is focused on the branch of AI called deep learning presenting cutting-edge research on all its aspects.

The Conference on Neural Information Processing Systems (NeurIPS) is a machine learning and computational neuroscience conference, also focusing on cognitive science, psychology, computer vision, statistical linguistics, and information theory. Over the years, the 'Neural' part has been reduced, but the resurgence of deep learning has led to achievements in speech recognition, object recognition in images, image captioning, language translation and world championship performance in the game of Go, based on neural architectures inspired by the hierarchy of areas in the visual cortex (ConvNet) and reinforcement learning inspired by the basal ganglia (Temporal difference learning).

The International Conference on Machine Learning (ICML) is the premier gathering of professionals dedicated to the advancement of machine learning. ICML presents and publishes cutting-edge research on all aspects of machine learning used in closely related areas like artificial intelligence, statistics and data science, as well as important application areas such as machine vision, computational biology, speech recognition, and robotics. Participants span a wide range of backgrounds, from academic and industrial researchers to entrepreneurs and engineers, to graduate students and postdocs. The 40th edition will be held in Seoul, South Korea, in 2023.

Other interesting and international conferences are:

Computer Vision (CV) conferences

The Computer Vision and Pattern Recognition Conference (CVPR) is the premier annual computer vision event and provides an exceptional value for students, academics and industry researchers.

The European Conference on Computer Vision (ECCV) is a research conference, one of the top in computer vision.

The [IEEE/CVF International Conference on Computer Vision (ICCV)] is the premier international conference in the field of computer vision.

The [British Machine Vision Conference (BMVC)] is the British Machine Vision Association (BMVA) annual conference on machine vision, image processing, and pattern recognition. It is one of the major international conferences on computer vision and related areas held in the UK.

Natural Language Processing (NLP) conferences

The [Meeting of the Association for Computational Linguistics (ACL)] is a premier conference of the field of computational linguistics, covering a broad spectrum of diverse research areas that are concerned with computational approaches to natural language.

The [International Conference on Natural Language Processing and Information Retrieval (NLPIR)] bring together researchers, which devoted their work to progress in the humans' interaction with the machines in their natural language.

The [International Conference on Natural Language Processing (ICNLP)] provides an international forum for exchange of ideas among interested researchers, students, developers, and practitioners in the areas of Natural Language Processing.

Agent technologies conferences

The [International Conference on Autonomous Agents and Multiagent Systems (AAMAS)] is the largest conference in the area of agents and multiagent systems, bringing together researchers and practitioners in all areas of agent technology and providing and internationally renowned high-profile forum for publishing and finding out about the latest developments in the field. The 22nd edition will take place 29 May – 2 June 2023 in London, United Kingdom.

The [International Conference on Practical Applications of Agents and Multi-Agent Systems] **(PAAMS)** provides an international forum to present and discuss the latest scientific developments and their effective applications, to assess the impact of the approach, and to facilitate technology transfer.

Human-computer and robot interaction (HCI) conferences

The [ACM Conference on Human Factors in Computing Systems (CHI)] is generally considered the most prestigious conference in the field of human–computer interaction (HCI) and is one of the top-ranked conferences in computer science. It brings together researchers and practitioners who have the goal to make the world a better place with interactive digital technologies.

The [18th ACM/IEEE International Conference on Human-Robot Interaction] will be held in Stockholm, Sweden, in March 2023 and will focus on key HRI theories, methods, designs, studies and technical advances that aim to understand and promote inclusion and diversity in HRI.

[IEEE International Conference on Robotics and Automation (ICRAMLDM)] brings together the world's top researchers and most important companies to share ideas and advances in the field of robotics and automation and their important role in the future of work and society, an important focus of this conference.

AI and machine learning conferences

Organized by the European Association for Artificial Intelligence (EurAI), the [European conference on Artificial Intelligence ECAI] is the premier venue for presenting AI research in Europe. ECAI is the place for researchers and practitioners of Artificial Intelligence (AI) to gather and to discuss the latest trends and challenges in all subfields of AI as well as to demonstrate innovative applications and uses of advanced AI technology. The 26th edition will be held in Krakow, Poland, October 1-6, 2023.

ICAPS, the [International Conference on Automated Planning and Scheduling], is the premier forum for exchanging news and research results on theory and applications of intelligent and automated planning and scheduling technology. ICAPS 2023 will be held in Prague, Czech Republic, July 8-13, 2023.

[Knowledge Representation and Reasoning conference (KR)] is the leading forum for timely in-depth presentation of progress in the theory and principles underlying the representation and computational management of knowledge.

The [AI4 conference] brings together business leaders and data practitioners to facilitate the responsible adoption of artificial intelligence and machine learning technology.

The [International Joint Conferences on Artificial Intelligence Organization (IJCAI)] is organized by the International Joint Conferences on Artificial Intelligence, a non-profit corporation founded in California for scientific and educational purposes on Artificial Intelligence. IJCAI conferences present premier international gatherings of AI researchers and practitioners. The 2023 edition will be held in Cape Town, South Africa.

The [European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECM PKDD)] is Europe's top machine learning and data mining conference, with over 20 editions.

The [ACM SIGKDD Conference on knowledge discovery and data mining] has already reached its 28th edition in 2022 and is the premier international forum for data mining researchers and practitioners from academia, industry, and government to share ideas, research results and experiences.

The [International Conference on Machine Learning and Data Mining (MLDM)] aims to bring together researchers from all over the world who deal with machine learning and data mining so as to discuss the recent status of the research and to direct further developments.

The [MIT Technology Review's signature conference on artificial intelligence (AI) and business leadership (EmTech Digital)] delivers editorially curated content to understand the implications of AI breakthroughs from the leaders in academia and business for those demanding real-world execution strategies.

6. How to reach / Benefits

The development of an international outreach strategy is crucial for many aspects. Acquiring a global perspective allows to navigate complexities, engage communities, and to expand a business. The main benefit are given by an increased online visibility, and the possibility to exchange ideas, values, and technologies. As it has already been shown above, international cooperation is one of the objectives of many of the national strategies and approaches for AI. For achieving so, it is important to understand languages and other countries' markets, cultures, societies, etc., as well as technologies and strategies.

One of the useful means to achieve so is attending an international conference. Attendance, of course above all if the conference is in presence, is related to the attendance fees (usually in a range between 0,4K and 2K dollars), the costs for travel and accommodation, and, in case the attendee chose to also have a booth there, the costs for the booth itself. Attending a conference as such can be expensive, but the benefits are huge, allowing to networking with international au pair and other companies, being informed about the latest findings and technologies, and to showcase itself.

Coordination with the NoE

An important part in the VISION project itself is the involvement of the NoEs (European network of AI excellence centres established under ICT-48-2020 RIA). In particular, VISION will create synergies with the already implemented activities of the NoEs by providing them an organisational support. Regarding the international outreach activities, the NoEs will be supported through regular scheduled calls and the definition of a common dissemination plan. This will avoid the waste of important resources and the doubling of effort. Regarding this last, a list of activities will be prepared to maximise the effort, so that if a NoE plans to attend an event, can be a sort of "spokesman" for the others and distribute materials (flyers, brochures, etc.).

7. Conclusion

Within this report, it can be appreciated how AI is becoming more and more pervasive in many aspects of society and sectors. Many countries and companies have transposed this success and thriving of AI into guidelines, plans, and strategies to take the most from it. Basically, all the countries considered have the ambition to become leader in one sector or the other.

Important to notice is the focus on the advancement of trustworthy and ethical AI, a point that almost all countries have in common; therefore, the importance to take into consideration also the ethical, legal, and societal implications of AI. This also means to analyse both the strong points of AI, but with an open mind to be able identifying and mitigating the risks. To do so, a critical role is played by education, training, and R&D, as well as by keeping the doors open for cooperation with the outside world.

These are all interesting points to be taken into consideration and that will guide the development of the outreach plan (one of the objectives of T6.2) by functioning as priority targets for it. A first analysis of possible benefits has been provided in this draft document, but it will be further developed in a more detailed cost/benefit analysis of the international outreach effort of the VISION project. At the project proposal stage, a first set of activities have been identified, these being:

1. promoting international standardisation efforts;
2. exchanging and attracting talents from international community;
3. organizing news coverage by traditional media outside the EU.

Activities 1 and 3 are not much covered by NoEs, thus we see the chance for supporting them in carrying them out. However, international standards on AI are being developed by ISO and IEEE but are limited to the improvement of AI products market efficiency or to address AI ethical concerns[38]. On the side of international laws and regulations on AI, these are rapidly emerging as related to the AI rapid development and the legal challenges this creates. In particular, regulations are needed to maintain control on the technology and to manage AI related risks.

Among the above-mentioned activities, the 2nd one is of greatest interest and the one more covered by the NoEs. However, there is a not need to find alternative funding since EU funding can only be used for European partners. This means that the NoEs cannot use the available EU funding to actually invite people from abroad, unless the host institution can get reimbursed, which isn't always possible.

[38] https://www.fhi.ox.ac.uk/wp-content/uploads/Standards_-FHI-Technical-Report.pdf

References

OECD.AI (2021), powered by EC/OECD (2021), database of national AI policies, accessed on 8/08/2022 , https://oecd.ai.

https://goingdigital.oecd.org/data/notes/No14_ToolkitNote_AIStrategies.pdf

Roberts, Huw & Cowls, Josh & Morley, Jessica & Taddeo, Mariarosaria & Wang, Vincent & Floridi, Luciano. (2021). The Chinese approach to artificial intelligence: an analysis of policy, ethics, and regulation. AI & SOCIETY. 36. 10.1007/s00146-020-00992-2.

https://www.fhi.ox.ac.uk/wp-content/uploads/Standards_-FHI-Technical-Report.pdf