

Innovation & Commercialization Working Group Report

November 2020 - GPAI Montréal Summit



GPAI |

THE GLOBAL PARTNERSHIP
ON ARTIFICIAL INTELLIGENCE

Please note that this report was developed by experts of the Global Partnership on Artificial Intelligence's Working Group on the Responsible Development, Use and Governance of AI. The report reflects the personal opinions of GPAI experts and does not necessarily reflect the views of the experts' organizations, GPAI, the OECD or their respective members.

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1. Executive Summary

In the Working Group on Innovation & Commercialization ([WG I&C](#)) of the Global Partnership on AI (GPAI), 30 experts with varied backgrounds and expertise from 15 countries collaborate to study and recommend practical tools, methods and actions that enable private actors and research organizations to drive international collaboration on AI innovation, to develop R&D outputs into products and processes, and to exploit these results for commercialization and widespread adoption

This group is chaired by Françoise Soulié-Fogelman, Scientific Advisor of Hub FranceIA; and Jean-François Gagné, founder and CEO of ElementAI. Both have been members of the European Commission's High-Level Expert Group on AI.

Objective of this report:

This report is the first deliverable of the Innovation & Commercialization working group. It results from the work of three sub-groups which were assembled during the summer of 2020. In such a short time, the sub-groups exploited the rich knowledge provided by the experts in the groups. However, they have by no means exhausted their topics: this report should thus be viewed more as setting the stage for our future work.

The goal of the Innovation & Commercialization working group is to make recommendations for supporting innovation, commercialization, and adoption of AI by industry. We take as our foundation the humane values that the GPAI stands for, aiming at “ethical by design” development of industrial and commercial AI systems. We also take into account the diversity of GPAI members and attempt to find recommendations which may apply in all the countries of the GPAI, possibly in different ways and at different paces, but following the same guiding principles.

Presentation of the sections of the report

This document reports the findings of these 3 sub-groups.

- **Sub-group 1: new business models.**
AI technologies have improved to the point where they are now widely penetrating into a wide array of organizations, including industry and government. As usual, business model innovation is necessary in order to benefit from technological innovation: so, AI is in the process of inventing new business models, which will be increasingly important to reap the value from the commercialization of AI products.
- **Sub-group 2: private sector**
We investigate the challenges that the private sector faces to innovate in AI and commercialize its products, and the solutions that can be put in place to address these challenges. We then present examples of private sector initiatives.
- **Subgroup 3: public sector.**
We investigate the major challenges/principles governments are facing and solutions that can be provided as well as solutions that should *not* be applied. We show initiatives in different countries to illustrate the different points discussed. Given that AI will impact the lives of every citizen, the solutions deployed by government are particularly important



An additional sub-group focusing on Intellectual Property protection for AI was also assembled and started working; its first deliverable will be addressed in the medium term in 2021.

In this report we have tried to list the goals and challenges which need to be addressed but we have not yet detailed the methods and solutions precisely enough. In the medium term, we will strive to identify ways to develop access to AI for all, to make sure competition is fair to all stakeholders and that the particular challenges faced by SMEs are properly addressed, taking into account the different geographies and their constraints.

Various important topics have been barely touched upon and will be further investigated in the next stages; these include the ongoing debate on the potential existence/impact of data or talent monopolies.

Disclaimer:

While we have tried to make this a consensus document, not everyone necessarily agreed with every statement or recommendation.



2. Introduction & the mandate

The Global Partnership on AI (GPAI) was created as an international and multistakeholder initiative with the mandate to guide the responsible development and use of AI in a way that is consistent with human rights, fundamental freedoms, and shared democratic values, as reflected in the OECD Principles on Artificial Intelligence¹. The initiative was launched by Canada and France along with Australia, the European Union, Germany, India, Italy, Japan, Mexico, New Zealand, the Republic of Korea, Singapore, Slovenia, the United Kingdom and the United States of America.

GPAI's mission, as agreed by its member countries, is to “support the development and use of AI based on human rights, inclusion, diversity, innovation, and economic growth, while seeking to address the United Nations Sustainable Development Goals.”² After its launch in June 2020, the GPAI brought together experts from diverse sectors into four specific Working Groups: Data Governance, Responsible AI (including a subgroup on Pandemic Response), the Future of Work, and Commercialization and Innovation - and gave them the task of supporting the GPAI in its mission.

The “Innovation & Commercialization” I&C WG has prepared this report. Its scope is to²:

- Study and recommend practical tools and methods that enable private firms and research organizations to drive international collaboration on AI R&D and innovation, to develop research outputs into products and processes, and to transfer these results to users for commercialization, with a special focus on SMEs.
- In the first years, the working group may focus on specific issues related to establishing trust in AI systems that are commercialized, since many argue that trustworthiness over the whole life cycle of the product is one of the key challenges for bringing AI research to market.
- It will also focus on innovation and reducing time to market, in line with our shared values, and the importance of R&D to address some of our mutual, most pressing challenges.

The I&C WG brings together leading experts from industry, civil society and academia to bridge the gap between theory and practice on AI by supporting cutting-edge research and applied activities on AI-related priorities.

This report is structured around the following three deliverables within the mandate:

- Address the new business models, new services, new ideas and new ecosystems made possible by AI. This first topic would be about new ways of doing business, new ways for companies to collaborate (R&D, innovation, value sharing, data sharing ...). In addition, we consider business-to-consumer, business-to-business and Public-to-Citizen business models.
- Study the mechanisms the private sector could put in place to promote AI innovation, commercialization and adoption (marketplaces, data sharing...). This deliverable should address, among others, the blocking issue, in some geographies, for startups/SMEs of accessing data: what mechanisms could be put in place to foster collaboration between private companies to pool and share data securely (for example in an encrypted way)? How to organize those pools? By sector? How to moderate the access? How to make more data available to SMEs, including startups? Which incentives would foster data sharing? Which standards to create? How to increase access to computing facilities.

¹ <http://www.oecd.org/going-digital/ai/principles/>

² Cf. Appendix GPAI Innovation and Commercialization Working Group Illustrative Mandate



- Analyze what the government could do, and should not do, to support innovation, commercialization and adoption of AI by sector and size (sharing public data, putting in place procurement processes to support innovation or startups, ...).

The co-chairs have planned to make progress on these first three topics. We decided to create catalogs to list the current initiatives, analyze them, propose remedies and new suggestions to accelerate the transfer from innovation to commercialization. This catalog of initiatives is in no way exhaustive and the Group will welcome pointers to initiatives from other countries to be included later in another version of the document.

A fourth topic related to Intellectual property (IP) will be addressed in the medium term, after the December 2020 plenary, as it requires in-depth study with legal and AI experts. The co-chairs invited 7 observers, specialists in IP & AI, to work on this important and complex subject. The work in this sub-group is still in its preliminary stage and is thus not presented in this report.

One important factor in the work of this group comes from the huge disparities between **geographies**: in gender or race access to education, or more important perhaps, talent. There is a huge imbalance in AI talent between North and South, between geographies in the North ("U.S. employs twice as many AI-skilled individuals than the EU, despite its total labor force being just half the size"³), between countries (UK, Germany and France centralize half of EU's AI talent³), or even between countries' regions (concentration of expertise in small hubs). Obviously, the needs, opinions and analysis, of nascent AI countries differ from those held by strong, thriving AI countries. While we tried to reach a consensus, this document reflects some of these discrepancies. Also, the report ignores the impact of the COVID 19 pandemic (there is a GPAI working group fully devoted to it). There can, however, be no doubt that its impact will be tremendous on the business outlook for 2021: it will likely accelerate adoption of digital technologies and AI, thus increasing opportunities for new AI business. But, at the same time, it risks further increasing the gap between developed AI countries and nascent AI countries.

³ <https://economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/PDF/AI-Talent-in-the-European-Labour-Market.pdf>



2.2. Scope of this document

The mandate of the I&C working group requires that we study and recommend tools, methods, solutions to innovate better, faster, to transfer research outputs to industry for commercialization, including SMEs, as required by our mandate (see Annex 6.3)

In the first phase of the work, the group has focused on building the ground for further work, asking the following questions:

- Are there specificities of AI for the innovation and commercialization process? What are the business models working at present and what are the new business models we can foresee?
- As for any new technology, the market is an interplay between research institutions, companies (large groups, SMEs and technological startups) and the public sector. We asked what the challenges were which the private and public sectors faced and listed solutions and initiatives which were deployed in selected GPAI nations: the full analysis of these initiatives will have to be done in the next period but some recurrent topics have emerged and they are described in the following 3 sections of the report.

The development of a thriving AI industry requires a balance between AI expertise (including organizational and individual), data and infrastructure. If one of the three is missing, the full impact of AI will not be reaped. When an innovation by a company proves successful in a first test, deploying it at scale can sometimes be very difficult and it is a process that may require a profound transformation of the company while potentially bringing enormous benefits. Many companies are still unable to figure out how to “do it” and end up producing multiple POCs (Proof Of Concept) which they cannot deploy. In particular, to date, most SMEs have not adopted AI solutions: they almost totally lack any knowledge of AI, they have neither the necessary talents nor the relevant infrastructure, and their data may not be of a quality sufficient for an AI system to be successful. Making sure SMEs benefit from AI is a huge challenge.

The private sector is seeing huge transformations of how AI is produced and commercialized, with new business models emerging. The overall importance of data in AI creates concerns in some geographies. A number of large internet companies lead in AI, in part because they are investing tens of billions of dollars in AI R&D (GAFAM) or because of strong government support (BATX): this may create monopolies and market failures in some geographies, where smaller companies might not get easy enough access to the market, thus stifling innovation and large spread of AI adoption. Nations should thus focus on ensuring that their AI ecosystems, including the support of new business models, is robust enough to enable more firms to enter the market.⁴

The public sector has a very particular role in supporting widespread adoption of AI. First, as a powerful user of AI, it can not only improve its efficiency and thus increase citizens’ trust in AI; it may also grow the AI market, for example by hiring innovative SMEs. Second, it can design AI plans and policies, funding initiatives and calls for proposals, thus orienting and sustaining the industry towards desired topics.

Finally, we have not analyzed in detail on the issue of SMEs. Because they represent the largest part of the jobs and GDP (Gross Domestic Product) in most geographies, deploying AI in SMEs is particularly important. We need special workshops and discussions to address their special challenges and identify the solutions they require. This will be our focus during the next period.

⁴ <https://thesiliconreview.com/magazine/profile/10-best-artificial-intelligence-companies-to-watch-2020>;
<https://clutch.co/ca/developers/artificial-intelligence>; <https://www.sonovate.com/quickview/50-hottest-uk-ai-companies/>



3. New Business Models

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3.2. Objective

This section discusses the new business models made possible by AI. To get widespread adoption of AI, we need innovative business models able to sustain fast-paced innovation and growth. The roles of data and infrastructures allow us to introduce what new business models could be, together with the new challenges they will face.

3.3. What is new with AI?

The Artificial Intelligence (AI) wave is likely to be the next major development in IT, with data as a key enabler. In its 2017 report, PwC⁵ estimates that AI is expected to create an additional economic value of USD 15.7 trillion by 2035.

In the foreseeable future courtesy AI economies will start reaping rich benefits because of cost advantages in labor and time. AI will penetrate more broadly because of the ML (Machine Learning) processes, wherein systems progressively learn and improve their performance over time. Thus, government and the private sector need to actively support innovation and adoption, in ways that support equitable growth. However, AI businesses are exhibiting unique challenges, in part related to intense competition and potentially lower margins in AI than in some legacy IT sectors.^{6, 7} However, we are starting to observe some interesting new patterns in new business models that are emerging. Three major new trends are emerging in this wave:

3.3.1 Scaling up of AI

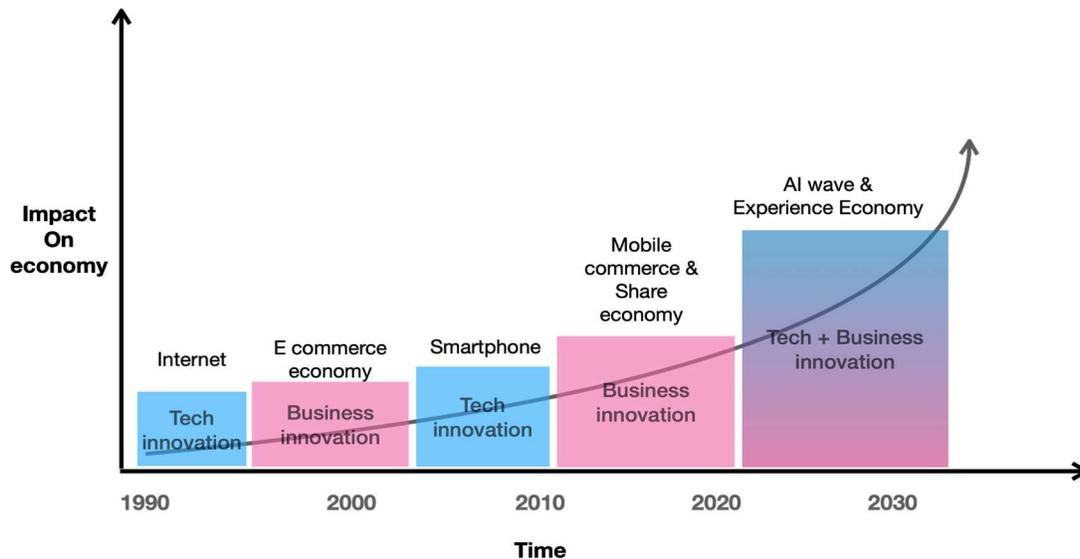
Unlike the previous two waves of internet and mobile, where technology change was followed by business model change, the AI wave is resulting in technology innovation and business model innovation happening together. This is going to result in an era of "hyper innovation", where multiple verticals will get disrupted, with the attendant consumer benefits, and with a potentially faster rate of innovation and adoption.

⁵ <https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html>

⁶ <https://a16z.com/2020/02/16/the-new-business-of-ai-and-how-its-different-from-traditional-software/>

⁷ <https://simplystatistics.org/2020/08/26/palantir-shows-its-cards/>





3.3.2. Core technology innovation built with AIoT (Artificial Intelligence of Things)

Innovations in AI (Compute, Data, Storage) combined with the Internet of Things (for autonomous actions) & 5G (always on, low latency communication) are leading to a completely new technology core with AIoT first companies. These companies are building their core business models around these technology innovations. Some of the major technological advances here, which are fueling the new core, are aspects of self-learning, autonomous decision making and new ways of leveraging data in a privacy preserving manner.

Unsupervised Learning

Unsupervised learning is an approach in AI in which algorithms learn from data without human-provided labels or guidance. In this approach, the system learns about some parts of the world based on other parts of the world. By observing the behavior of, patterns among, and relationships between entities—for example, words in a text or people in a video—the system bootstraps an overall understanding of its environment.

In self-supervised learning, a portion of the input is used as a supervisory signal to predict the remaining portion of the input. Unsupervised learning is already having a transformative impact in natural language processing. NLP (Natural Language Processing) has seen rapid progress recently due to a new unsupervised learning architecture known as the “Transformer”.

Transformers

Prevalent NLP methods, based on recurrent neural networks (e.g. LSTM: Long Short-Term Memory) process data sequentially — that is, one word at a time, in the order that the words appear. Now, the technology breakthrough is the release of Transformer GPT-3 NLP model of OpenAI, which has captivated the technology world. It has set a new standard in NLP: it can write impressive poetry, generate functioning code, compose thoughtful business memos, write articles about itself, and so much more by leveraging massive training data. Such transformers might completely break new ground and create building blocks (see horizontal utilities below) which can be leveraged by nimble startups to build on top of their customer use cases with differentiation and added value.



Privacy aware computing and learning data

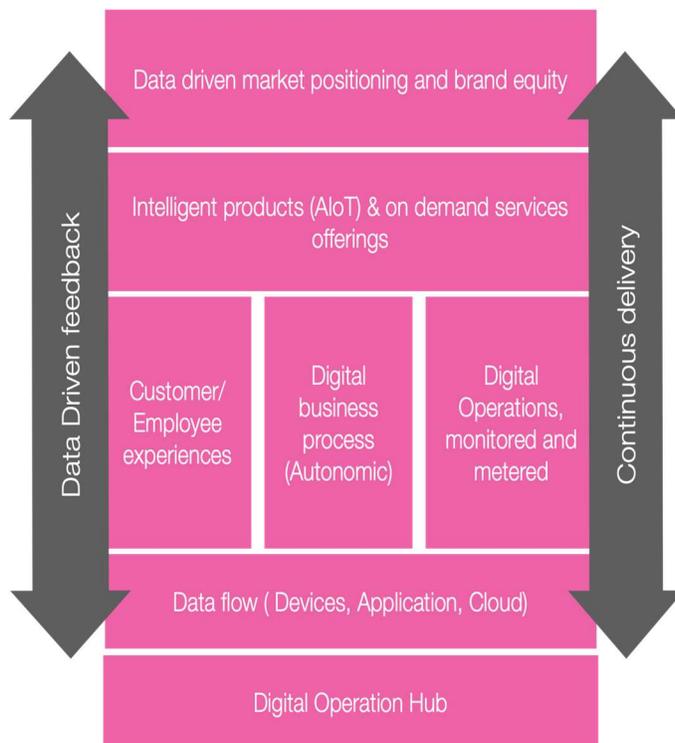
One of the overarching challenges of the digital era is data privacy. Because data is the lifeblood of modern artificial intelligence, data privacy issues play a significant, and often limiting role in AI's trajectory. One such promising approach to privacy-preserving AI is federated learning, another one is learning on encrypted data.

Rather than requiring one unified dataset to train a model, federated learning leaves the data where it is, distributed across numerous devices and servers on the edge. Instead, many versions of the model are sent out — one to each device with training data — and trained locally on each subset of data. The resulting model parameters, but not the training data itself, are then sent back to the cloud. When all these “mini-models” are aggregated, the result is one overall model that functions as if it had been trained on the entire dataset at once.

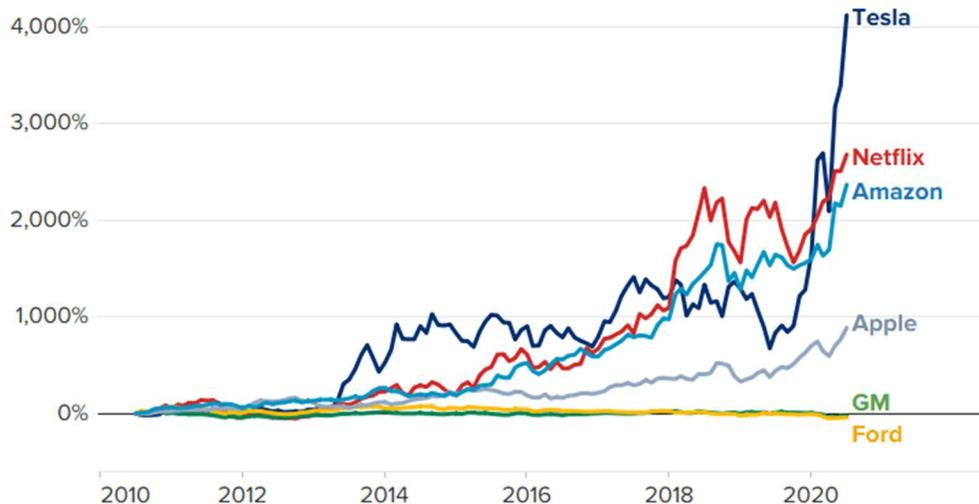
More recently, healthcare has emerged as a particularly promising field for the application of federated learning. It is also playing a central role in a wide range of fields from financial services to autonomous vehicles, from government use cases to consumer products of all kinds. Paired with other privacy-preserving techniques like differential privacy and homomorphic encryption, federated learning may provide the key to unlocking AI's vast potential in ways that address the important challenge of data privacy.

3.3.3. Business flywheel driven by data feedback in a continuous loop

We are starting to see companies creating a flywheel of rapid change with continuous data feedback loops about the three core processes of any business, namely customer acquisition, customer operations and customer retention, to drive continuous new innovations. Companies that are able to master these continuous improvement and innovation cycles are very rapidly outpacing their competitors.



In a sense, having this continuous improvement via the data feedback loop can provide a competitive advantage for these businesses. A case in point is the soaring stock prices of Tesla, Netflix, Amazon and Apple, each of which has mastered the loop. Such companies are even plowing back their understanding of this learning loop from software to hardware. For example, both Tesla and Apple are creating their own silicon to take market share from hardware-only companies⁸.

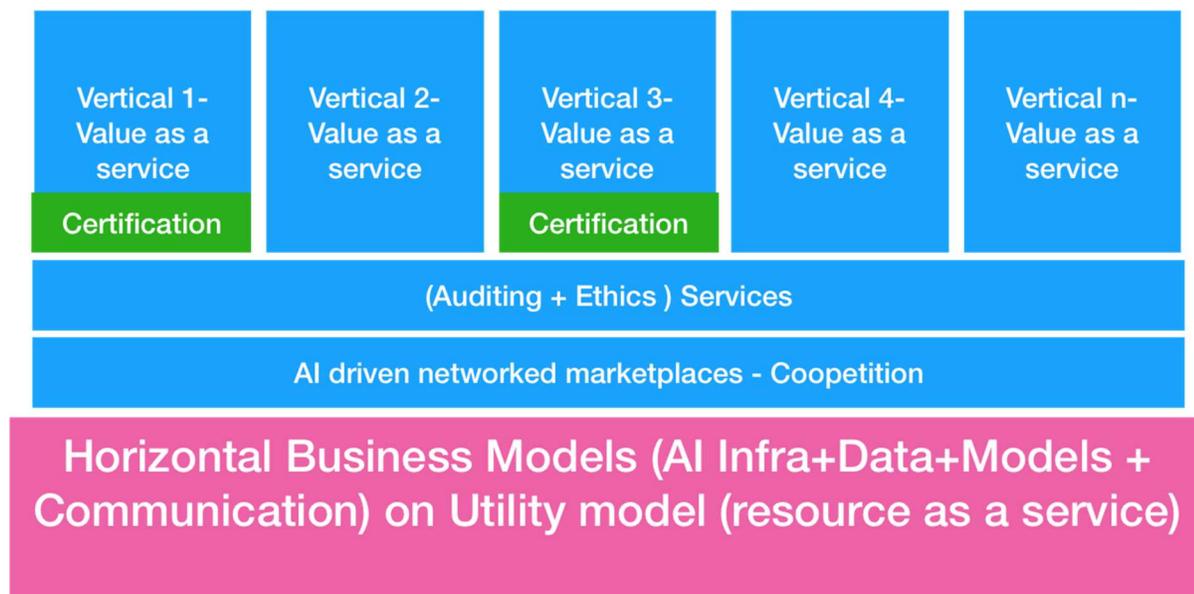


SOURCE: FactSet. Data shows return on a monthly basis through market close on June 29, 2020.



3.3.4. What does it mean for the new business model?

From the structural perspective, we can break down the new emerging business model in AI with 3 core areas: outcome/value model, coopetition model and servitization model, from top to bottom in the figure below.



⁸ <https://www.apple.com/newsroom/2020/06/apple-announces-mac-transition-to-apple-silicon/>



Outcome/Value Based Model

AI-based solutions offer optimization, prescription, and prediction resulting in an overall reduction in cost or new workflow or increased access to assets. The actual performance depends on the solution model and algorithms along with the data that is fed in. To avoid overpricing vis-à-vis underpricing, this "Value as a service" model provides payment linked to the actual outcome of deployment of the solution. This is specific to a vertical use case. For example, if an AI-based solution claims energy optimization in a process industry, then energy savings over a given period of time will be the baseline for payments. In a sense, this can also be seen as a performance guarantee model. This model will have long gestation periods and large funding requirements, unless companies are able to rapidly build it on top of horizontal utilities and is suited for collaborative/collective efforts where many companies/individuals may participate. There are many small companies that operate this model, often focused on particular industry segments where larger companies do not have the depth of expertise.⁹ (see Lemonade model below)

Servitization Model (Resource as a service, Raas)

In today's agile world, return-on-investment (ROI) is expected in shorter time cycles. CAPEX investments are seen as long-term ROI strategy while OPEX investments are seen as an immediate/short-term ROI strategy. In this model, AI solutions are offered/deployed as a service and payment is based on usage, which is based on a combination of time, number of times used, quantum of data, etc. This model works well for an AI infrastructure, data or communication in a horizontal model very typical of electric utilities, broadband providers, and other service providers. We suspect that, for some applications, this might be occupied and dominated by large companies, given the large investments and long return cycles. However, there is a possibility of building multi trillion-dollar businesses here with a winner-takes-all model. The tricky part would be not having this monopoly reduce innovation for the ecosystem.

Co-opetition Model or AI Networked Marketplace model

AI solutions depend on both algorithms and data. A typical solution provider is generally excellent with algorithms while specific and limited data set is used to verify the solution for the application considered. In many cases, data is proprietary and only available with the customer/user. In this model, both the solution provider and the customer mutually agree and co-create the solution. The solution provider either gains specific domain knowledge and a validated solution in the end for future sales/service or proves his/her worth for continued partnership with the current customer, or a combination of both. Often, they are collaborating and competing at different value points and streams.

In this model, the tools and technologies can be developed horizontally by the contribution of AI experts at diverse nodes which can benefit various verticals that can work on the same technology. These horizontal models and tools can be applied in myriad verticals, resulting in lower cost of development and deployment for all participants. This can be offered as a service in SaaS mode for revenue realization.

In collaborative innovation models, networks of companies (or ecosystems) may assemble to create tools which each will complement with its own knowledge and data to commercialize its own product or which they will collectively commercialize. Such innovation models require carefully crafted revenue-sharing models, safeguarding the interests of collaborating stakeholders

Interesting example: Lemonade Business Model

Lemonade, a company offering home insurance policies, is a pioneer in the InsurTech world where its use of machine learning (ML) goes beyond satisfying customers and driving efficiencies to underwriting risks and managing claims^{10,11}. The business Model of Lemonade is slightly different from other models in that it

⁹ <https://www.fbn.com>

¹⁰ <https://digital.hbs.edu/platform-rctom/submission/lemonade-reinvents-the-insurance-industry-with-machine-learning/>

¹¹ <https://www.businessmodelsinc.com/the-business-model-of-lemonade/>



encourages philanthropy by clients' consent. This combines a for-profit model with not-for-profit data attribution. Further, the processes are made extremely simple and intuitive by deploying AI-driven, user-friendly Chatbot, which is very cleverly designed to cover the entire gamut of questions that a client opting for insurance may ask.

3.4. What are the new challenges in the new emerging business model?

3.4.1. Potential conflicts of interest

Large companies playing in the AI infrastructure, Data and communication arena can try to enter other vertical markets, creating better models by leveraging data insights about the vertical market players¹². While this can support AI innovation and provide better customer solutions, there is a risk that companies could use anti-competitive means once they have built these businesses. This is an area for competition policy authorities to monitor, in order to ensure that behavior by these larger companies is not anti-competitive.

There is an important debate here about competition: the AI big tech players are perceived by many as a threat to innovation¹³ because of their access to data, infrastructures and talent, while other analyses claim that these large companies are not acting as monopolies¹⁴. This discussion has not been not settled in the working group (and might never be), yet it is clear that innovation, as measured by scientific publications, is largely dominated by these large players¹⁵.

More work will be needed in this group to understand where and how competition policy authorities should monitor the behavior of these larger companies.

3.4.2. Complex tax structures for governments

Value as a service model or outcome-based models with global operations are very difficult to understand for governments and might either result in over taxation or under taxation. Both of these scenarios are a challenge from the long-term sustainability perspective of the ecosystem. For example, AI networked marketplaces will encourage dynamic value discovery among participants leading to complex tax scenarios, which will be difficult to profile, audit and regulate with added complexity by virtue of them being in different geo locations. Lack of technology expertise within governments will further escalate the difficulty. If governments are not able to tax fairly, either this will result in less money for its charter or more litigations, or higher taxes on some companies in some jurisdictions than is warranted.

3.4.3. Complex go-to-market for various segments

We can traditionally characterize business operations in 3 major areas based on how you define customers or payers. All 3 areas have their unique challenges in the AI age.

“Business to Business” (B2B)

Involving AI-based business models where Data, Models, Tools and Infrastructure, etc. are shared between companies. This can work very efficiently using a “Collaborative Innovation Model” in a federated structure, as the cost is spread across the collaborators, resulting in faster ROI. However, challenges regarding data privacy and a reluctance to share data and models have resulted in slow or non-adoption of these data models. However, with new privacy preserving techniques, such as encryption or federated learning, this could change in the next 2-3 years. It is worth noting that in B2B the question of personal data is much alleviated, with most data being non-personal, industrial data.

¹² <https://www.crn.com/news/cloud/aws-creates-conflict-for-amazon-needs-regulation-house-subcommittee>

¹³ <https://mitsloan.mit.edu/ideas-made-to-matter/will-regulating-big-tech-stifle-innovation>, <https://www.parlia.com/a/monopolies-reduce-innovation>

¹⁴ <https://itif.org/publications/2020/11/09/monopoly-myths-big-tech-creating-kill-zones>, <https://itif.org/publications/2017/03/06/myth-data-monopoly-why-antitrust-concerns-about-data-are-overblown>, <https://faculty.haas.berkeley.edu/shapiro/arrow.pdf>

¹⁵ <https://www.natureindex.com/news-blog/google-scholar-reveals-most-influential-papers-research-citations-twenty-twenty>



“Business to Consumer” (B2C)

Data, Model, Tools, Products and Infrastructure selling to Researchers, Academia, students, analysts or such other consumers. Also marketing aspect pertaining to AMC and customization can also be looked into (community building). By baking in communities deeply, the cost of customer acquisition and support is brought down and could be a category where future leaders could emerge.

“Public to Consumer” (P2C) & “Business to Public” (B2P)

Governments are in an abstract sense large cooperative, where data providers (citizens) are also owners in a fundamental way. Government gets involved in promoting their products and making available an e-Marketplace for government-controlled organizations and other consumers, lowering the cost of acquisition. Unfortunately, current processes tend, too often, to call on the same big players, because of lack of in-house expertise, which leads to a lot of prudence and makes it hard for the public sector to take calculated risks. This increases the difficulties for SMEs wanting to answer the calls for proposals of the public sector.

Government contracts can be an important source of support for AI companies but may face issues like:

- Long lead times,
- Cumbersome processes,
- Institutionalized corruption.

3.5. How can we create an inclusive and sustainable innovation and commercialization ecosystem?

3.5.1. Fair opportunity for all, via open Data, talent, domain, research, and capital

AI ecosystems globally need to create a fair opportunity for small businesses and startups to ensure diversity in innovations. This can be done through the following key enablers.

- **Data** - Open data banks may be contributed by the government and voluntary business corporate partners in a privacy preserving model, which incentivizes the data owner and data fiduciary as well. In Europe, there are funding programs to foster data sharing initiatives between companies to alleviate data monopolies and benefit innovation and adoption as a whole. However, some studies argue that the notion of data monopoly and market power from data is significantly exaggerated¹⁶.
- **Talent** - Open Talent via encouraging academia to train/reskill talent, supported by government support or subsidy and providing R&D subsidy to open or join startups via a venture studio model. At the present time, there is an increasing gap between talent champions (mostly in high-income countries) and the rest of the world¹⁷ and companies of all sizes report the difficulty to hire talent as their major challenge¹⁸. Governments must thus make sure talent is not concentrated in the hands of a few countries / companies, thus distorting competition and equal access to market.
- **Domain** - Open Innovation driven domain advisors from all across the globe, facilitated by consortiums, govt. and academia.

¹⁶ <https://itif.org/publications/2020/07/23/monopoly-myths-do-internet-platforms-threaten-competition>

<https://itif.org/publications/2020/10/23/seventeen-flaws-cicilline-antitrust-report-competition-digital-markets>

¹⁷ <https://www.insead.edu/sites/default/files/assets/dept/globalindices/docs/GTCI-2020-report.pdf?ct=12648>

¹⁸ <https://ec.europa.eu/digital-single-market/en/news/european-enterprise-survey-use-technologies-based-artificial-intelligence>



- **Research** - Enable open and networked research models funded by government or large companies as part of corporate social responsibility and made available to everyone. Encourage the private sector to do in-house R&D, including through the R&D tax credit.
- **Capital** - AI innovation funds partially funded by government and supported by industry with reduced tax structure to attract capital from participants. Capital availability is very different depending upon geographies and international tax mechanisms may hurt less developed countries¹⁹. “Open” models such as the Mozilla foundation²⁰ model, could, in some cases, help create interesting innovation and commercialization models.

3.5.2. Model for key AI infrastructure, data and communication providers

Large AI Infrastructure, data and communication providers play a very important role for SMEs access to AI. The cost of use of the infrastructure is sometimes too high, especially for small businesses and research teams. In some geographies, it is felt that the market is dominated by too few players and that it would better to have more actors. It could also be advisable to devise ways for small companies and academia to access infrastructure (including cloud) at lower costs.

- Enabling strong economic incentives for certification, auditing and ethics services

The GPAI can play a part in supporting services to enforce a level playing field globally, to ensure that companies in nations that do not develop responsible AI, do not have an unfair advantage. This can be done by encouraging responsible AI use and, in some areas, requiring AI certification and auditing.

¹⁹ <https://www.theguardian.com/business/2020/oct/26/big-tech-accused-of-avoiding-28bn-in-tax-to-poorest-countries>

²⁰ https://en.wikipedia.org/wiki/Mozilla_Foundation



4. Private sector

4.1. Contributors

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4.2. Scope and output

Scope

What mechanisms could the **private sector** put in place to promote AI innovation, commercialization and adoption?

The **objective** is to discover **private sector initiatives** that are successfully promoting AI development. 'Success' is their ability to achieve that goal. We need to report on the frameworks or models that are drivers for that success.

- What are the key roadblocks to adoption, innovation and commercialization?
- Which solutions exist and what makes them work well?
- What services or support do they provide?
- Do they need to be sponsored or funded by governments to be successful?
- How do they form and leverage partnerships between companies to create a program that successfully promotes AI development

Output

We collect high-level roadblocks and challenges of the private sector for adoption, innovation and commercialization of AI. Then, we collect high-level solutions to address these challenges and roadblocks. This is a top down approach by the members of the sub-group experts. Solutions can include also new business models or public sector initiatives (with links to the other two sub-groups).

We plan to collect best practices and initiatives from selected countries that are successfully addressing some of the challenges today, in a bottom-up approach. The countries included are the home countries of the group members (Japan, India, Singapore, Germany, Italy, France, ...) plus selected countries, such as the USA, Canada, Scandinavia and the UK. These initiatives are listed in Appendix 6.1.

We map the results in a matrix to discover best practices

	Challenge 1	C2	...
Solution 1	Initiative a, d	...	
S2	...	Initiative b, c	
...	

4.3. Analysis of AI innovation & commercialization in the private sector

We are at the beginning of a transformation towards a data driven economy. Artificial Intelligence (AI) is a key component of this transformation. AI innovation and commercialization will be critical success factors for countries and businesses.

To understand the challenges and roadblocks involved we have to look at the Social-Technical Environment consisting of:

- AI adoption
- Data Economy
- Digital Infrastructure

All need to be developed and balanced. In countries, businesses, ecosystems, ...

Although the high-level challenges and solutions described below are relevant to almost all businesses, there are different solution approaches due to the specific situation in a country or an industry segment. This is reflected in the initiatives developed by companies and the way they address some of the challenges in their given environment.

4.4. Challenges and Roadblocks

This section outlines high-level roadblocks and challenges of the private sector to the adoption, innovation and commercialization of AI.

4.4.1. Challenge 1 – Scaling up AI adoption

Title: Getting AI to mass adoption by various segments of industry.

Short description. Today, some of the leading adopters of AI have been cutting edge internet companies such as Google, Facebook and Netflix. They have proven the utility of AI to boost performance. However, other segments of industry such as traditional large companies and SMEs are laggards in their adoption of AI. They are often unsure of the technology, lack the appropriate skills, they may not have the data and the confidence to adopt AI. There is also a lot of hype surrounding the space and companies are unsure what is real and what is not. As a result, companies, when they start developing AI prototypes, very often end up being unable to deploy them at scale, which is the only way to get value.

4.4.2. Challenge 2 – Access to data

Title: Ensuring data is available in a form that can be used by AI algorithms in a smooth way with equal access to all.

Short description. Today, when companies think of digitization, many still have a mental model of a paperless office with an electronic store of images in PDF format that can be moved around the organization. We need to change this mindset; the data needs to be stored in a form that can be machine readable and with a well-defined data standard/schema, with efforts for inter-operability of data repositories. This will enable data to be shared more readily and enable better take up of AI.

One organization taking the lead in this area is the Open Data Institute based in the United Kingdom. They have proposed the use of data standards and educates the community about the various issues surrounding data through the use of training, thought leadership papers and case studies.

In some applications, annotation and standardization of large volumes of data are necessary for training AI programs, so access to domain-specific data sets, that are annotated and standardized is critical. But AI scientists are presently working on algorithms that require less data and many industry segments, such as automation and manufacturing, have developed systems that can learn with much smaller data sets. In other words, not all AI is “big data:” some is small data. For example, Rockwell Automation has developed AI manufacturing systems that can be trained on limited data sets²¹.

In a data economy, companies with the largest data pools can have advantages. For example, studies have shown that increasing a speech corpus size by 5 times reduces word-error-rate (i.e. errors in speech-to-text translation) by 10% or more, while cutting cost by significantly reducing the need for manual rating. Such a 10% reduction in error rate formerly used to take a generation of research. A combination of a “first mover advantage” for these large data-driven platforms and businesses, with the sizable network effect and enormous data that they have collected over the years, has made it harder for some start-ups to enter particular markets.

4.4.3. Challenge 3 – Access to money

Title: Ensuring funding is available to support innovation and commercialization at all stages.

Short description. Innovation in AI is costly so all companies, from start-ups to large groups, need significant funding to foster their innovation and commercialization efforts in AI. Access to money is thus a major challenge. Of course, the situation is different between supplying AI vs those buying AI. Both sides need to be addressed differently, which we will not do here, but will analyze further in later versions of our work.

Solving this challenge can take two forms: developing an early access to the market or raising Venture Capital (VC) funding.

We should think about access to money from different industry segments in the country. Multinational Corporations (MNC) and large local companies who are not from the IT space, for example, manufacturing, commodities, utilities, etc., may not yet be using AI and they will need to make a major effort to transform themselves to integrate AI into virtually all of their operations. SMEs support these large companies as contractors, and they make up the bulk of companies in most countries. They too should be encouraged to adopt AI. Finally, start-ups could tap AI to generate new products that the technology enables. However longer time required to create deep technology requires access to patient risk capital for startups, especially in less mature ecosystems. Such startups might be critical to increasing the diversity of AI solutions.

4.4.4. Challenge 4 – Access to technical infrastructure

Title: Ensuring companies can have access to technical infrastructures for testing their innovations (sandboxes), while preserving their data and IP.

Short description. Developing AI solutions requires significant technical infrastructure, both hardware (GPUs, edge, cloud access) and software (data wrangling tools, machine learning libraries, pipelines orchestration). Before investing in the right infrastructure for its product/ service, companies, especially start-ups and SMEs need to test their ideas on existing infrastructures, where their data and ideas are protected: sandboxes offer such a possibility, possibly together with technical support.

²¹ <https://www.aiche.org/conferences/aiche-annual-meeting/2019/proceeding/paper/269c-real-time-analytics-iiot>



4.4.5. Challenge 5 – Access to talent

Title: Most companies are not AI-native, so, in order to implement AI, they need to identify the talents they need and then hire them.

Short description. In a market where AI talents are scarce, companies new to AI, will have to compete with companies that may have a better knowledge of AI and higher salaries to offer. The process of building an AI team in the company needs to be addressed at the very beginning of the AI transformation: some large companies choose to create a central team and hire the talents needed, others adopt a mixed approach, hiring some data science talents, and up-skilling selected members of their staff.

AI start-ups have the knowledge and understanding of which talents they need, but have a hard time competing on the package offered to expert data scientists.

4.4.6. Challenge 6 – Access to training

Title: Most companies being non-AI-native need to train their staff. Whereas data science experts are probably hired, many collaborators in place in the company at all levels will have to work with AI and will thus need to be up-skilled.

Short description. Collaborators are essential to a company: they know the business and the market, and their experience is critical. However, when AI is deployed, existing processes are impacted and need to be adapted. Collaborators must thus learn enough about AI that they can work with the new AI solutions, run them, fix them when there is an issue etc. Re-skilling and up-skilling collaborators need dedicated training programs that might not be available in academic training, because of the necessary, specific business knowledge involved. Also, the number of collaborators who need to be trained may be very large (up to tens of thousands) depending on the company.

4.4.7. Challenge 7 – Build-up AI awareness

Title: Adoption of AI solutions in the workforce and with consumers depends on awareness and understanding of the technology.

Short description. Many people still have no understanding of AI. It is important to develop a basic understanding of the technology, what it can and cannot do, in order to have the necessary awareness with the users. This is critical for companies of all sizes to scale AI adoptions but also for the public in general. Businesses have to build up the understanding and awareness of AI at all levels, which will help build trust and avoid a widespread Luddite sentiment.

4.4.8. Challenge 8 – Trust and Regulation

Title: Regulations around the use of data are in place to protect personal data and increase customers' trust. Companies need to make sure their AI implementations are compliant.

Short description. Regulations on AI, in particular on data, may be complex and expensive to comply with: large groups will have to put in place a proper structure to handle them. Smaller companies may not have sufficient resources and expertise to make sure their AI implementations are compliant. Digital Innovation Hubs could help provide assistance to these companies.

4.4.9. Challenge 9 – Access to Innovation

Title: Some SMEs do not have enough resources to develop innovation in AI, so transfer of technology from universities, institutional research or startups would help them develop faster.

Short description. It is hard to transition AI solutions developed in research labs to commercial markets.



Whereas large companies usually have their own labs, SMEs mostly do not have such facilities or resources for AI; they are focused on their products. As a consequence, if they want to innovate with AI, they need to identify research labs and innovations suited to their needs. Facilitating this access would significantly speed-up the uptake of AI among SMEs.

4.4.10. Challenge 10 – Ensure Privacy Protection

Title: Protection of personal data is required by regulation and is also necessary to foster citizens' trust in AI.

Short description. Most AI applications are based on massive volumes of data that must be learned and used to learn and make intelligent decisions. Machine learning systems depend on data that are often sensitive and personal in nature. The European Union has implemented the General Data Protection Regulation (GDPR) that requires companies to ensure the complete protection of personal data. Companies have to address this in their AI strategy and adoption (e.g. with a Data Protection Officer).

The Indian Government has shared a draft report on a Non-Personal Data governance framework as part of its effort to spur innovation by leveraging data as an asset²². The report recommends establishing a Non-Personal Data Regulatory Authority with an enabling role as well as an enforcing role, which is very specific to India, and is not considered a necessity in other geographies.

4.4.11. Challenge 11 – Create Governance Framework (e.g. Liability)

There is increasing concern regarding the risk of harm associated with the use of AI solutions if they are not deployed in a responsible manner, and the data within these models is not managed properly. Organizations will need to develop ethical principles to govern the development and use of new technologies, with the aim of mitigating the risk of harm that these technologies might bring, otherwise some organizations risk very significant and potentially crippling fines. Organizations also have to define a clear responsibility framework in case of failure of their AI solutions.

4.4.12. Challenge 12 – Create acceptance for users (Internal + External)

Applying AI at scale often fails at the level of the humans who need to use and work with AI solutions. Either some try to make the system fail (e.g. racist Microsoft Chatbot²³) or do not use the system at all. There is still a considerable lack of understanding of the relationship between trust, explainability and the use of AI. Some argue that the problem with AI is that it is often like a black box for people where they do not feel comfortable when they do not understand how a decision was made or how a system works. This question is not settled yet, but at present AI has not been able to create wide acceptance among users.

4.4.13. Challenge 13 – Switch to an experimental Development approach

Many companies have historically learned to prosper by following a traditional approach to R&D—one that is deliberately incremental, thoroughly planned and research-driven, and frowns on trial and error. Becoming an active AI player requires a different culture and different innovation approach: to pilot early, to test, to learn—and to fail along the way.

Classical software engineering needs to be complemented with an experimental development approach designed for building AI solutions. Software 1.0 needs to be combined with software 2.0.

²² https://static.mygov.in/rest/s3fs-public/mygov_159453381955063671.pdf

²³ <https://www.technologyreview.com/2018/03/27/144290/microsofts-neo-nazi-sexbot-was-a-great-lesson-for-makers-of-ai-assistants/>



4.5. Solutions

It is important to understand that there are many solutions developed in different geographies and they very much depend upon the culture, level of development and awareness of AI, so we do not have one solution which would fit all. The list of solutions we describe below is not final, it will be refined and completed in later versions of the document.

4.5.1. Solution 1 – Trusted Advisor

There is a role for a trusted organization, probably partially funded by the government, to showcase practical and proven AI solutions, train manpower in AI technologies, stimulate interest in the power of AI and seed adoption in companies using ready-made solutions appropriate for the mass market and with bespoke solutions for larger enterprises.

4.5.2. Solution 2 – Assessments and Roadmaps

Provide assessments that allow businesses to understand their maturity level of AI adoption. Provide roadmaps with best practices for AI adoption based on maturity level, industry segment and company size.

4.5.3. Solution 3 – AI Community of Practice

Community of Practice to share resources in the form of training, pre-packaged code, case studies, certification to assist companies, get on the AI learning journey close to a sort of Stake Overflow for AI.

4.5.4. Solution 4 – Access to AI Infrastructure

Build open AI infrastructure open to companies and research organizations to allow access to and sharing of AI compute, tools and data.

Major IT vendors as well as public organizations have created Frameworks to enable rapid development of AI systems. These Frameworks are generalized and enable a wide variety of AI systems to be developed. However, it may also make sense to create an end-to-end AI system development solution targeted to a specific type of solution if there is a significant market in a critical area. For example, developing chatbots that target a particular country (because of the language) or region (local domain knowledge), and that understand the local context.

Sweden is creating a Data Factory which comprises the technological infrastructure, data, legal frameworks and know-how of managing and accessing large and complex datasets. It enables the partners to donate or license data, access data and to use storage and compute power for AI projects.

India is creating open access to AI compute infrastructure.

4.5.5. Solution 5 – Access to AI Startups

For many companies it is still very difficult to develop AI solutions. The AI adoption and speed of innovation can be accelerated by providing faster access to AI Startups through overviews of Startups and their solutions (for specific industries / segments) including first quality checks. An AI label might be useful to foster startups exposure to the market.



4.5.6. Solution 6 – Venture Capital for AI Startups

Depending in the geography, AI Startups may need more access to angel and venture investments to grow and scale. Dedicated AI Funds would be a solution. Long-term investment and patience may be needed to reach full success.²⁴

4.5.7. Solution 7 – Data Pools & Data sharing

Many companies are currently looking for new ways to access data or are working on cooperative data utilization models. Such models allow supply chains to be organized more efficiently or networked research collaborations to be set up. Data pools and data sharing will be an important driver for the development of competitive AI solutions.

Data sharing between companies has been very hard historically, but new techniques, such as data encryption and federated learning are changing the game. Incentive mechanisms will need to be invented to support such initiatives.

4.5.8. Solution 8 – Experimental Hubs and Initiatives

People need to have the chance to experiment and get used to learning systems. This can be done through showcases, games, visualizations or expert sessions, among others.

4.5.9. Solution 9 – Work on Human Centered AI

Humans are ultimately users and customers of AI applications. Sharing knowledge and building best practices around how solutions can best serve and support humans should be accessible to every interested company.

4.5.10. Solution 10 – AI with Board Level Responsibility

Exchanges and expert sessions between board members to put AI at board level and to provide guidance and best practices regarding what every board member should know and do about AI, especially for SMEs. This requires dedicated training sessions for board members. If a company's board is not aware of what AI benefits and risks are, deploying AI within the company is close to impossible.

4.5.11. Solution 11 – Comprehensive Application Programs

Successful AI application is not only about building a technological solution. Comprehensive application programs reflect this and combine apprenticeship and upskilling programs with strategic and organizational transformation as well as with the development of a working solution. The programs are typically from 9 months to 1.5 years and aim to achieve the successful continuation of the activity after the program has finished. As an example, one can see the 100 Experiments in Singapore:

(<https://www.aisingapore.org/industryinnovation/100e/>).

²⁴ <https://www.weforum.org/agenda/2018/04/patient-capital/>



4.5.12. Solution 12 – Transfer from Research to adoption

To accelerate transfer from research to adoption, we need to adopt a closely knit "Idea to impact" framework, where universities, research parks, venture studios and venture funds work collaboratively to create new AI companies, support existing companies and work together to create effective standards and open frameworks.

For Multi-National Companies and large local companies, Private-Public-Partnerships with research organizations and government tax allowances/rebates could be a source of funding to spur research and the adoption of AI. Government could also incentivize MNCs to conduct joint research with universities/research institutes via their research funding or tax policy schemes. For SMEs, government could subsidize and/or make available standard pre-developed AI applications at low cost so that these SMEs could benefit from using AI as soon as possible.

Business incubators connecting research labs and industry, Open Innovation Labs or Digital Innovation Hubs could help stimulate the transfer of technology from research to commercial markets.

4.5.13. Solution 13 – Cooperating ecosystems

Value-added networks enable innovative service offerings based on platform-based, data-driven business models and AI solutions via flexible, dynamic and automated interaction or collaboration between different actors.

AI-based solutions require different core competencies and system modules. One company alone usually does not have all the necessary elements. In addition to needing access to data sources, organizations often lack expertise in the areas of data analytics and AI. Cooperation with providers of data, technology and digital platforms can help to build up the necessary knowledge about value networks or alliances within digital ecosystems. A collaborative business model has to be put in place to share the value between the different members of the ecosystem.



4.6. Mapping Challenges – Solutions - Initiatives

Initiatives for the private sector are listed in Appendix 6.1. In the table below, we summarize the positioning of the various initiatives, by showing the challenges they address and the solutions they provide.

Solutions	Challenges												
	C1 - Scaling AI adoption	C2 - Access to data	C3 - Access to money	C4 - Access to technical infrastructure	C5 - Access to talent	C6 - Access to training	C7 - Build-up AI awareness	C8 - Trust and regulation	C9 - Access to innovation	C10 - Ensure privacy protection	C11 - Governance Framework	C12 - User Acceptance	C13 - Experimental Development approach
S1 - Trusted Advisor	1,11,12,13		3		3,14	1,14	1,11,13		1,11,12		1		
S2 - Assessments and Roadmaps	1				5,11	5,11	5,13		5,11,12				11
S3 - AI Community of Practice	11,13	7,13		1,7	4,5,7,11,14	5,7,11,14	4,5,11,14		4,5,7,11			1	
S4 - Access to AI Infrastructure	2		6	1,2,6,9									
S5 - Access to AI Startups	1,8,10,12		6		1,5,6,8		5,6		1,6,8,10				
S6 - Venture Capital for AI Startups	3,10		3		3								
S7 - Data Pools		7					13						
S8 - Experimental Hubs and Initiatives	1,11	10	6,11		4,5,11	5,10,11	1,4,5,11,5		4,5,10,11	11		1	11
S9 - Work on Human Centered AI							5	4,5					
S10 - AI with Board Level Responsibility	1										1		
S11 - Comprehensive Application Programs		10											
S12 - Transfer from Research to adoption	11,12		3,6,11	2,9	3,9,11				4,6,9,11,12				1,6,9,11
S13 - Cooperating ecosystems		7											

In this table, initiatives are shown by their number: for example, initiative 1 (appliedAI) provides solution 1 (trusted advisor) to challenge 1 (scaling AI adoption):

1. appliedAI / Germany
2. ABCI / Japan
3. BIRD Initiative/Japan
4. Manifesto/France
5. Hub France IA (France)
6. PackIA (France)
7. Combient / Nordics
8. KI Bundesverband / Germany
9. DFKI / Germany
10. National AI Mission / NM-ICPS / India
11. AI Singapore / Singapore
12. Realization of a Smart Society by Applying Artificial Intelligence Technologies (AI in a Smart Society, AISS) /Japan
13. AI Hospital System /Japan
14. Japan Deep Learning Association (JDLA)/Japan



5. Public sector

5.1. Contributors

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5.2. Introduction

5.2.1. Mandate

The mandate is to produce a set of recommendations to submit to the government in order to support innovation, commercialization, and adoption of AI by industry. Unlike other technologies, AI will impact the lives of every citizen and the relevancy of every industry, and therefore a coordinated and regulated approach from the government is important.

The focus of the report will revolve around what the government could do and should not do, to support innovation, commercialization and adoption of AI.

5.2.2. Approach

We recognized there are differences between different countries in terms of business practices, culture, government policies, the level of AI literacy, and the level of AI readiness in the economy. Therefore, we will focus on the desired outcome or behavior rather than specific desired processes.

We hope to establish the destination and let each country plot their own path to reach it.

Regarding policy initiatives, we note that there is often a problem in that governments can create too many new support programs, frequently with little prior assessment of the commercial demand for these services – and this can cause confusion for firms and be wasteful.

Therefore, a general principle should be – where appropriate - to adapt the services that institutions offer so as to take into account specific features of AI, rather than create entirely new institutions.

5.3. General Challenges to guide AI innovation and commercialization policy

As many governments work to spur innovation and commercialization of AI, it is important that they consider a number of key overriding principles/challenges:

5.3.1. Prioritize AI innovation and commercialization

Given the importance of AI to economic growth and overall innovation, nations should seek to align policies and programs to support robust AI innovation, commercialization, and adoption. AI policies should support measuring and benchmarking AI adoption across key industries and identifying barriers to commercialization of AI that policymakers can address.

5.3.2. Size Neutrality

Policy should be neutral with regard to size. In most countries, firms of all sizes are engaged in AI innovation, commercialization, and adoption, and as they are part of the same ecosystem, requirements or policies that impact large firms can impact smaller firms. As such, policymakers may decide to ensure that all AI policies, including tax, infrastructure, R&D, skills, and regulation are size-neutral, not biased either towards large or small firms. However, policy should provide increased support for start-ups and SMEs to help them grow and become major innovators and employers. That would require dedicated policies from government.

5.3.3. Balance Public Interest and Commercialization Goals

When considering regulations related to AI, policy makers should seek to balance public interest goals with innovation and commercialization. This means that any regulatory framework should seek to understand all impacts on innovation and commercialization and where possible, to minimize any negative impact.

5.3.4. Be Technology Neutral

Policy makers are often told that AI is unique and extraordinary and that it needs specific regulation. But any requirements applied to AI applications should be consistent with requirements for other processes or technologies in the same area or industry. For example, if governments require explainability of decisions for AI, they should also require explainability of decisions made without AI. In addition, prior to introducing regulations, policymakers should carry out thorough gap analyses, as existing legislation may already sufficiently cover AI systems and address issues such as liability and consumer protection.

5.3.5. Be Country Neutral

Because of the importance of AI to nations, they should create policy environments that maximize AI opportunities. This means that when nations adopt AI support policies, they should be open, where possible and appropriate, to companies and organizations from all countries that support GPAI principles. Embracing “AI nationalism” can mean reducing overall AI innovation and commercialization by limiting access to global best-practice AI capabilities.

5.3.6. Be Ethical Aligned

Commercialization and innovation, other than regulations, should also be guided by a set of ethical principles. Regulations alone are insufficient to cover every potential application and abuse of AI. While regulations establish the ‘freedom within framework’ for organizations to operate, ethics guide the intention and obligations of their actions. Ethical principles provide a moral compass to guide organizations in moments of decision-making when there is no clear guidance.



5.3.7. Promote International Cooperation

Policies established should promote international cooperation because AI models, and thus innovation and commercialization, thrive on availability and diversity of data. Without international cooperation, the government will be restricting its economy and citizens from benefiting from the full potential of AI: locally trained AI models will not perform overseas, and overseas applications will not work locally. International cooperation is a symbiotic relationship that facilitates innovation, benefits citizens, and grows economies.

5.4. Solutions

5.4.1. Solution 1 – Infrastructure & Trust Platform

5.4.1.1 Governements should support investment in infrastructure and establishing trust platforms to support investment

Most governments are supporting the development of AI firms through industrial partnerships, funding, and talent development. This is unsurprising: it has been the usual go-to-approach to develop any nascent industries.

However, AI differs significantly from other industries. AI, at its core, requires robust computing and data infrastructures to support the development of the AI industry. Such infrastructures are essential for training complex and deep algorithms, thereby enabling innovation and commercialization.

Putting resources into developing the AI industry without ensuring proper infrastructures are in place would be akin to putting resources into developing the internet economy without an appropriate broadband infrastructure. The immature internet infrastructure would be able to support the bandwidth necessary for data streaming. Similarly, an immature AI infrastructure would limit the potential development of AI models.

Another aspect of data and computing infrastructure is the establishment of trust platforms. Trust platforms, in the most general sense, allow secure data transfer and sharing. Data is the lifeblood of AI models. Without trust platforms, organizations will face an uphill task each time they wish to collaborate, as they have to undergo fresh discussions to decide on appropriate and acceptable ways to share data.

Trust platforms facilitate data sharing and allow organizations to focus on innovation rather than getting bogged down in negotiations around data sharing. Established trust platforms and robust infrastructures will help accelerate the AI development and innovation efforts.

5.4.1.2 Desired outcomes of Governements for infrastructure & trust platform development

- Established and competitive AI infrastructures that are accessible to companies (of all sizes), entrepreneurs and academic researchers.
- Established “data trusts” to enable widespread data availability, particularly in key public interest areas, to support AI innovation.

5.4.2. Solution 2 – Coordination of Resources

5.4.2.1. Governements should coordinate scarce AI resources to overcome limitations and produce impactful outcomes

Governments should encourage and enable collaboration between and among public and private sectors to avoid duplication of work. Duplicated work happens when each individual organization attempts to solve similar problems in the same way. This wastes precious AI engineering and computing resources.



Another aspect of resources is data. The performance of AI models is largely dependent on an abundance of good quality data. By coordinating the efforts of industry, such as in the healthcare sector, end users will benefit from better AI performance and industry players might develop AI models which would otherwise be impossible due to data limitations.

5.4.2.2. Desired outcomes of Governments for infrastructure & trust platform development

- Create a national AI strategy to establish national priorities and national organization to rally resources around national priorities
- Promote collaboration among and between public and private sectors by establishing frameworks and guidelines
- Introduce support programs that go beyond funding in order to enable companies to undertake AI projects internally
- Establish industry-specific AI centers to coordinate industry-specific AI resources

5.4.3. Solution 3 – AI Literacy and Talent Development

5.4.3.1. Governments should support accessible and inclusive AI talent development

Most institutes of higher learning, such as polytechnics and universities, are offering AI and data science related courses. However, these courses are usually geared towards full-time students and have strict academic requirements prior to admission. Given that these courses and programs are often oversubscribed, governments should invest to expand them.

However, there need to be more pathways for professionals with domain expertise to gain AI knowledge with flexible pathways to achieving those capabilities.

Grooming AI talents will not be sufficient to accelerate the innovation and commercialization of AI. The general public should at least be aware of AI and generally how it works, as this is the best solution against misinformation. AI adoption might derail if the general public is misinformed about AI solutions and applications.

5.4.3.2. Desired outcomes of governments to develop AI literacy and groom AI talent

- Recognize that domain expertise is important and necessary for successful AI model innovation and commercialization.
- Provide multiple pathways, not just via tertiary education, for aspiring AI talents to acquire necessary AI knowledge and gain professional experience in deploying AI projects.
- Enable inclusive AI literacy development among the general public as they are the end-users of AI applications. They can ultimately have an effect on AI innovation and commercialization through their adoption.

5.4.4. Solution 4 – Regulations

5.4.4.1. Governments should adopt a principled, balanced approach to regulating AI

Appropriate regulation enables innovation. Appropriate regulation sets the guidelines, expectations, and rules for AI development and applications. With clear rules and guidance, industry players would be able to innovate 'within the framework'.

Inappropriate regulation, conversely, stifles innovation. Given the pace of AI development, it is understandable that once appropriate regulations might rapidly become inappropriate. Regulators might not have precedence for reference and lack technical expertise to understand the nuances of new AI technologies.



Regulators could actively engage stakeholders to obtain their inputs and seek their technical expertise to appreciate the potential applications and abuse of AI. With informed decision making, it is possible to govern the applications of AI technology instead of imposing an outright ban on the technology.

Regulators could also consider adopting AI standards, which provide a set of industrially established best practices, to guide AI model deployment and usage. Adopting AI standards ensures the relevancy of policies as AI technologies evolve and promote international collaboration as an increasing number of countries have a common set of references.

Regulators should always consider whether existing regulations are sufficient before introducing new regulations to govern AI. This helps to avoid conflicting or overarching policies. Regulators should also be cognizant that all technologies, whether AI or not, should have the same standard of regulations if they are applied for the same application. If fairness and transparency are key requirements of all AI applications, for instance, then all technologies deployed should be subjected to the same expectations. AI should not be penalized just because of its potential and methodology.

5.4.4.2. Desired outcomes of governments to regulate AI

- Pro-innovative governance systems that govern appropriate AI applications rather than outright banning of technology or hindering it so that development and adoption are slowed down.
- Engage and consult industry stakeholders to understand and address the concerns of industry.
- Regulators and policymakers should have sufficient basic AI literacy to make informed choices.

5.4.5. Solution 5 – Appropriate Support

5.4.5.1. Governements should develop appropriate support and funding programs

AI talents are scarce. Despite the best of efforts to develop and attract AI talents, not every company, especially small- and medium-sized businesses, has the necessary AI engineering expertise to embark on AI projects. Governments should introduce support programs that could enable companies to undertake AI projects while building internal AI capabilities. This would help organizations to innovate and adopt AI solutions.

Institutes of Higher Learning have generated intellectual properties on AI through fundamental research. However, not all research breakthroughs are commercialized. Governments should also explore support programs to assist faculties to commercialize their research and enable industrial innovation.

5.4.5.2. Desired outcomes of governments to support AI adoption

- Develop appropriate support programs to help build internal capabilities of organizations while enabling them to embark on the AI journey
- Develop appropriate support programs to help researchers commercialize their research breakthroughs to enable industrial innovations

5.5. What governments should *not* be doing

We have consolidated the feedback and reviewed some of the initiatives that governments have implemented. Through a series of discussions and reviews, the team has reached the following list of approaches that the sub-group has recommended that governments should avoid.

5.5.1. Inappropriate Approach to Regulations

This section highlights the importance of striving not just to achieve the right balance of regulation, but also the right approach to regulation.



5.5.1.1. One-size-fits-all broad mandates

A key insight raised by the sub-group was to avoid over-regulation of AI from various different angles.

Refrain from introducing excessive bureaucracy

One insight gained was that governments should refrain from introducing excessive bureaucracy into the field of AI regulation, as the inefficiencies that are created could negatively impact a country's competitiveness in the AI sector.

Follow existing regulatory frameworks

Another core insight was that if governments enact AI regulation, it should be, wherever possible, in line with existing regulations, as opposed to having AI as a separate monolithic set of regulations. In this example, governments would add additional AI regulations to existing sets of industrial regulations and avoid introducing excessive or inappropriate regulations to industry that are not regulated. For instance, in many nations, healthcare, finance, and transportation are regulated. It would make sense for AI models in these industries to be regulated in compliance with existing risk assessments and regulations within the industry vertically, rather than adding separate layers of AI regulatory regimes.

5.5.1.2. Imposing regulations without consulting or engaging stakeholders

Given the pace of AI development, it is impossible for governments to have all the technical expertise internally to fully understand and appreciate the potential applications and challenges of AI technology. Governments should engage and consult industry experts and relevant stakeholders rather than drafting regulations in silos.

Coordination between stakeholders is essential

One insight that was raised was that in an effort to respond to the speed of AI development, governments risked developing 'national level' policies without any consultation, coordination or legitimacy. Even riskier was having governments impose their solutions and strategies without adequate consultation.

Coordination between stakeholders on a national level is thus essential, and without this, countries will risk being last to adopt proper AI-based technologies and approaches, due to bureaucracy and conservative behaviors arising from a lack of understanding and coordination.

5.5.1.3. Banning technologies instead of governing their uses

Governments, as far as possible, should avoid banning AI technology applications. Rather, where there are application areas of concern, governments should seek to find appropriate ways to govern their application.

Overly stringent AI regulations, including on privacy

Success in AI requires innovation and that requires firms not being subjected to overly burdensome regulations on the development or use of AI. These include broad mandates for explainability of AI or government pre-approval of algorithms.

In addition, data is a key ingredient in AI. As such, governments should avoid overly stringent privacy regulations that unduly limit data collection and use, including limits on the use of de-identified data²⁵.

Bans on cross border data flows or AI algorithm use

Many organizations, even small businesses operating in one country, will need to move data involved in AI across borders. While governments are clearly within their rights to regulate data, they can do so without limiting cross border data flows.

²⁵ <https://www.datainnovation.org/2018/05/how-policymakers-can-foster-algorithmic-accountability/>

Restricting the practice of AI and software development to a limited group of individuals

Even to “safeguard” the development and deployment of the technology, such restrictions may have negative side effects (see for example bill 29²⁶ in Quebec which got stopped at the last minute).

5.5.2. Inappropriate Approach to Development

5.5.2.1. Failing to address the social gap for inclusive growth

Governments should be mindful of AI policies that may unfairly benefit segments of society that are in a better position to benefit from the proliferation of AI, while currently marginalized segments of society fall even further behind. Policies and the use of AI should not just keep fairness as a priority, but also actively seek to reduce social gaps. One way to do this is to set up explicit approaches to address the issue of “data poverty” (limited data on particular places or demographic groups).

5.5.2.2. Outsourcing AI development to consultants without building internal capabilities

Governments should also avoid completely outsourcing AI capabilities to external consultants. As far as is practically possible, governments should develop internal AI capabilities and use those capabilities to learn and draft practical policies.

5.5.2.3. Imparting skills without imparting the right mindset towards AI

It is also important for governments to let the private sector lead in the development and adoption of AI, and avoid policies and programs where too many people or companies become dependent on government support, and will not move on AI without government incentives.

5.5.3. Setting a Bad Example for the Private Sector

5.5.3.1. Adverse to adopting AI while expecting private sectors to embrace AI

In most countries, the government tends to be the single biggest purchaser of IT. With that comes the power to support efforts for setting standards and appropriate rules around the type of technology they are purchasing. So, governments should lead by example. It is a double-standard to expect private sectors to adopt AI when the public sector is skeptical or has low AI adoption. Governments could actively adopt AI solutions to signal to industries the benefits of AI adoption. They should use procurement as a powerful means to encourage adoption and guide the development of the technology.

5.5.3.2. Monopolizing sectors critical to AI development

Providing computing infrastructure helps drive innovation. However, the government should not be monopolizing the computing infrastructure industry and stifle competition/innovation. This means enabling private sector competition in AI infrastructure, including from companies in countries that respect GPAI principles.

5.5.3.3. Conflicting and uncoordinated policies

Governments should also be mindful of inadvertently making laws and enacting regulations that contradict each other, such as issuing policies against algorithmic decision making while promoting the use of AI. This can happen when rulemaking and regulation-setting is not conducted holistically. Initiatives from the public sector are listed in Appendix 6.2.

²⁶ https://codifyupdates.com/current_bill_status_quebec/bill-29-an-act-to-amend-the-professional-code-and-other-provisions-in-1559775948736x502559164972138500



6. Appendix

6.1. Private sector Initiatives

Many initiatives have been developed in the world, addressing some of the challenges listed above: we give here details on some of these initiatives. This list is certainly not comprehensive, but we use it to inform our study of challenges and solutions. A more comprehensive list is provided by the OECD AI Policy Observatory²⁷ with information on over 300 national AI policies from 60 countries.

The initiatives listed here may be similar in different countries but are deployed differently according to their culture. Also, initiatives presented here are viewed from the private sector angle. Initiatives presented in the next section are viewed from the public sector and might duplicate some cases in this section, but with a different point of view.

6.1.1. Initiative 1 – appliedAI/Germany <https://www.appliedai.de>

Short description of the initiative (Structure, funding, key goals)

appliedAI is Germany's largest initiative for the application of AI technology with the vision to lift the whole country into the AI age. appliedAI is part of UnternehmerTUM, one of the largest innovation centers in Europe and a non-profit organization. There are some 40 people working for appliedAI, and more than 200 for Unternehmertum.

appliedAI was formed as a neutral and trustworthy initiative that acts both as a platform and service provider. Founding partners were, among others, BMW, Google, Infineon, Linde, NVIDIA, and Siemens. Partners pay a yearly fee to get access to training and consulting, AI data center, data scientists and more. As a non-for-profit organization appliedAI is also supporting the adoption of AI in Germany outside their Partner Base with content, open training and more.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

They address AI challenges, both in the application and applied research, from a strategic and innovation standpoint as well as with a perspective on education and people development.

As a service provider, they deliver the latest in AI technology implementation, AI strategy definition and execution as well as AI education and re-skilling of organizations (details: <https://www.appliedai.de/services>).

appliedAI publishes a list of the most promising AI Startups in Germany (<https://www.appliedai.de/hub/2020-ai-german-startup-landscape>). They support German AI startups to identify pilot customers, access data, find talent, and select hardware resources.

In collaboration with its partners, appliedAI has developed a maturity assessment tool that allows companies to understand their current situation with regard to AI adoption. applied AI also provides an AI Journey mapped to the maturity status which helps companies to define their own roadmap to AI adoption based on best practices. They changed their support from offering a mix of separated services (supermarket) to following the guided journey approach (recipe).

What are the elements of their success? Describe the framework, program they have used.

- Closed industry partner program (paid) to allow exchange of best practices and open discussions
- New partners have to go through an approval process to avoid competitive situations and ensure open collaboration

²⁷ www.oecd.ai



- High quality content – mostly open to the public
- Strong network and collaboration with other initiatives in Germany and Europe
- Very strong team of experts in AI strategy, AI research and AI adoption
- Close collaboration with technology partners to have access to latest technologies
- Own AI development team to work with industry partners
- Own Academy team to work with industry partners and provide open trainings.

Do they need to be sponsored or funded by the government to be successful?

No.

What are the key challenges addressed by the initiative

- Help leading (large) industrial partners to develop and execute AI strategy and adoption
- AI Education for Germany
- Help businesses to understand their AI adoption maturity and the best road to AI adoption
- Strong voice in political discussions in Germany and the EU to promote AI adoption.

Contact (GPAI) for more information

Ingo Hoffmann, Andreas Liebl

6.1.2. Initiative 2 – ABCI/Japan

AI bridging Cloud Infrastructure <https://abci.ai/>

Short description of the initiative (Structure, funding, key goals)

The ABCI was established by public funding and existing services. The ABCI is being used by private companies, public research institutes and universities. It aims to provide a powerful computational infrastructure (>4000 GPUs) with large data storage and links to the national highspeed communication network. It is maintained by the AIST (National Institute for Advanced Industrial Science and Technology). As of March 2020, 326 groups use the ABCI for their research and development, including AI start-ups and SMEs, large private companies and research groups in the AIST and universities.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

Compared with IT giants such as Google, Microsoft, Facebook, Baidu, etc., AI research and development groups in Japan, in both private and public sectors, suffer from lack of proper computational infrastructures. The ABCI not only provides a powerful computational infrastructure to research and development groups, but also enables them to share common software technologies using big GPU clusters and common data sets. It has successfully accelerated AI development in Japan.

What are the elements of their success? Describe the framework, program they have used.

An initial investment was provided by the government. Then, with the cooperation of groups from the public sector (HPC groups in the AIST and Riken, Tokyo Institute of Technology) and the private sector (Fujitsu and Sony) started to provide basic technology for exploiting the powerful infrastructures. The management group of the ABCI has organized events to accelerate the use of the ABCI such as challenge tasks, tutorials, etc.

What services or support do they provide?

Not only the large GPU cluster but also tool kits such as workflow design tools, optimizers of higher-parameters, large-scale pre-trained models, publicly available large data sets, etc. are all provided by the ABCI.



Do they need to be sponsored or funded by the government to be successful?

Yes, the initial fund to build the ABCI was provided by the government (2018). The government provided further support in 2020 to increase the computational power. Due to the rapid progress in the HPC field, they expect a renewal of the current ABCI to be required in three years.

What are the key challenges addressed by the initiative?

Many players in Japan such as AI start-ups and companies, that want to adopt AI technologies for their businesses, and research groups in academia lack proper computational infrastructures for building large-scale trained models of DL, manipulating large scale graphs, solving large scale optimization problems.

Contact (GPAI) for more information

Junichi Tsujii

6.1.3. Initiative 3 – BIRD Initiative/Japan

https://bird-initiative.com/en/_

<https://jipinc.com/wp/wp-content/uploads/BIRD-INITIATIVE-established-to-accelerate-the-creation-of-new-businesses-through-cooperative-RD.pdf>

Short description of the initiative (Structure, funding, key goals)

BIRD Initiative was established in September 2020, by 6 private companies:

- NEC (IT/AI Technology vendor)
- OBAYASHI CORPORATION (Construction Company)
- Japan Industrial Partners, Inc. (Investment Fund)
- Japan Investment Adviser Co., Ltd. (Consulting Firm)
- ITOCHU Techno-Solutions Corporation (IT Services)
- AOI Fund 1 (Investment Fund operated by UTokyo Innovation Platform Co., Ltd.)

It aims to create new businesses from collaborative R&D among businesses, financial companies and academia. While the company covers broader areas of DX, one of the main pillars of their technologies is AI. They cooperate closely with researchers from two large research institutes (AIST and Riken) and universities (Osaka University and the University of Tokyo).

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

BIRD is formed by a large AI technology vendor (NEC), investment funds (JIP and AOI Fund), a Consulting firm (JIA) and an SI company (Itochu Techno-Solutions Corp.) to provide a launch pad for new start-ups. A team would be organized by researchers from NEC and academia (AIST, Riken and Universities) to develop technological solutions to problems of user companies, and the solutions would lead to new start-ups, the process being helped by the investment funds, the consulting firm and the SI company. Researchers who are interested in the newly formed start-ups would move to or be involved in them.

What are the elements of their success? Describe the framework, program they have used.

The framework called “Co-Creation” comprises different types of stakeholders to support the sharing of human talents and funds from different sectors and to encourage dynamic exchanges of human resources between academia and industry. We have to wait and see whether this framework works well. However, their first AI product based on joint research of NEC and AIST has attracted a few potential user companies and will lead to a new AI start-up.

What services or support do they provide?

BIRD provides a venue where AI researchers, investors and AI user companies gather to create new AI businesses.



Do they need to be sponsored or funded by the government to be successful?

No.

What are the key challenges addressed by the initiative?

Unlike other technological fields, AI innovation needs to continuously cooperate with user companies and evolve quickly. To create new AI businesses requires researchers, user companies and investors to cooperate closely.

Contact (GPAI) for more information

Junichi Tsujii

6.1.4. Initiative 4 – Manifesto/France

Manifeste pour l'intelligence artificielle au service de l'industrie (Manifesto for Artificial Intelligence for Industry)

https://www.fr.total.com/sites/g/files/wompnd351/f/atoms/files/manifeste_ia_industrie_signe.pdf,
<https://www.edf.fr/groupe-edf/espaces-dedies/journalistes/tous-les-communiques-de-presse/ai-for-humanity-edf-thales-et-total-ouvrent-le-premier-laboratoire-industriel-commun-en-intelligence-artificielle>

Short description of the initiative (Structure, funding, key goals)

The partners consider that AI is a source of jobs and progress, compliant with the national AI strategy. The main task of Manifesto is to launch coordinated AI actions between industrial companies, between industry and academics, and between industrial companies and public authorities.

The first visible action is a joint lab between Thales, EDF and Total on trustworthy AI.

Manifesto brings together sixteen industrial partners: Thales, Renault, Valéo, EDF, Total, Safran, Air Liquide, Dassault Aviation, Orange, Naval Group, Airbus, Michelin, Saint-Gobain, Schlumberger, Véolia and ST Microelectronics.

The project benefits from academic support from the CEA, Université Paris Saclay, Institut Polytechnique de Paris, Sorbonne University, University Grenoble Alpes

There is no budget, members participate through in-kind contributions.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

It is still too early to tell.

What are the elements of their success? Describe the framework, program they have used.

The projects are cross-sectoral and involve a critical mass thanks to the mobilization of sixteen industrial companies + academics.

The initiative now plays the role of being the single interface with public authorities in AI for the sixteen members.

The first example of action is SINCLAIR, a joint lab between EDF, Thales and Total on explainable AI, reinforcement learning, and AI and simulation

Manifesto creates working groups (at the moment: embedded AI, attractiveness & education, standardization & normalization).

What services or support do they provide?

None



Do they need to be sponsored or funded by the government to be successful?

The project does not involve public funding, but it played a part in defining an “acceleration plan for AI” that will be launched in December 2020 by the government.

What are the key challenges addressed by the initiative?

- Lack of trust, responsibility, safety and security, explainability needed for critical systems
- Insufficient usage of AI
- Insufficient visibility of AI solutions
- Lack of available talent
- Sovereignty issues

Contact (GPAI) for more information

Françoise Soulié.

6.1.5. Initiative 5 – HUB France AI (France)

<https://www.hub-franceia.fr/en/>

Short description of the initiative (Structure, funding, key goals)

Hub France IA is a not-for-profit association founded in 2017 by independent members of the French AI ecosystem, to promote a dynamic AI ecosystem in France and Europe, to foster the development of new players and the sustainable competitiveness of French companies facing non-EU disruption or value loss, to boost AI adoption in all industrial sectors by creating cooperation projects at both a national and European level.

Hub France IA deploys resources to ease peer-to-peer interactions and cooperation and facilitate sharing best practices. It also helps its members to prepare joint proposals, share data or prepare training programs.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

Members of Hub France IA share their experience and work together to find solutions. Hub France IA provides expertise to contribute to the activities of working groups on various topics, depending on the members’ focus of interest (<https://www.hub-franceia.fr/groupes/>).

Hub France IA organizes meetups and conferences to spread AI knowledge. Through its program « Un jour, une start-up » (one start-up a day) it showcases the start-ups, members of Hub France IA, helping them to find customers.

Hub France IA publishes a panorama of French AI start-ups²⁸ (in cooperation with appliedAI and Sweden) and white papers (e.g. AFRC: “AI for customer relationship”²⁹ and on AI for the environment, soon to be released).

An AI index tool is being developed within a working group to evaluate start-ups and deliver them a label

What are the elements of their success? Describe the framework, program they have used.

- Closed working groups to share best practices and work together to produce deliverables (reports, white papers, training programs)
- High level technical meetups (closed) or general-purpose conferences (open)
- Strong collaboration with French government AI initiatives

²⁸ <https://www.ai-startups.fr/>

²⁹ <https://atelier.afrc.org/livre-blanc-start-ups-xc>



- Support to members for building collaborative projects (e.g. data sharing projects)
- Collaboration with academics to design training sessions, develop research programs or run working groups

Do they need to be sponsored or funded by GOVT to be successful?

No. Hub France IA's budget is based on its members subscriptions and its contracts.

What are the key challenges addressed by the initiative?

- Help large groups and start-ups to share best practices
- Help develop AI training at all levels, from expert MS level to more basic levels
- Develop networking activities to promote AI in government programs

Contact (GPAI) for more information

Françoise Soulié

6.1.6. Initiative 6 – Pack AI (France)

<https://www.packia.fr/>

Short description of the initiative (Structure, funding, key goals)

Paris Region launched its Plan IA 2021 in October 2018 (<https://www.iledefrance.fr/la-region-ile-de-france-presente-son-plan-regional-sur-lintelligence-artificielle-ia-2021-et-les>) to promote AI in companies located in the Paris Region. In particular, PackIA, the first measure in Plan IA, targets SMEs, which represent 75% of jobs and 70% of the French Gross National Product.

SMEs that have started their digital evolution can significantly boost their growth with AI, but they face specific challenges due to their lack of experience in AI : they need expertise in identifying suitable projects and support to implement them with the right talents.

Answering a call for proposal from the Paris Region, Hub France IA and IMT Teralab <https://www.teralab-datascience.fr/> have assembled a Consortium of companies specialized in AI (BearingPoint, Business & Decision, Capgemini, Quantmetry and SystemX) together with AI start-ups, members of Hub France IA and IMT.

A project is 3 months long, financed half-half by the Region and the SME. The goal is to produce a prototype ready for development at the end of the project and show a significant potential ROI: the SME learns how an AI project is designed and executed, which talents are needed, which processes need to be transformed. After the SME is better equipped to run more AI projects.

The goal is to produce 30 projects in 2020, then 60 and 100 in 2021-2022.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

This project is allowing SMEs to understand the benefits they can get from AI, while learning on their own project how they can do it. Without such a program, SMEs say they would not be able to get access to AI and would not invest in AI. It also allows them to establish relationships with expert AI companies, which they often decide to use after the end of the project.

What are the elements of their success? Describe the framework, program they have used.

The elements of success for the SMEs project come from the way the Consortium was assembled:

- Hub France IA and Teralab lead the process of sourcing SMEs, identifying potential projects and matching them with a potential implementer, AI service company or start-up.
- The implementers have been chosen because they are experts in AI, with extensive experience in realizing projects.



- There is no discussion about commercial conditions: fixed price and fixed length. SMEs appreciate that they do not have to negotiate on topics they know they are unfamiliar with.
- Then the implementer takes over and is fully in charge of the realization of the project
- Hub France IA acts as a trusted third party between the implementer and the SME, which knows it can count on support if needed.

Do they need to be sponsored or funded by the government to be successful?

Yes, the projects are supported by funding from the Paris Region which has completely delegated the design and execution of the program to Hub France IA, Teralab, and the members of the Pack IA Consortium.

What are the key challenges addressed by the initiative?

- Help SMEs understand the value of AI to their business
- Help SMEs learn how an AI project runs, which talents they need and how they need to transform to deploy AI
- Build confidence in AI for SMEs

Contact (GPAI) for more information

Françoise Soulié

6.1.7. Initiative 7 – Combient/Nordics

<https://combient.com>

Short description of the initiative (Structure, funding, key goals)

Combient is a Nordic industry network consisting of 29 leading Swedish and Finnish large enterprises jointly working on key digital transformation initiatives. It originated in Sweden, where in 2015 the Wallenberg family launched Combient and WASP (the Wallenberg AI, autonomous Systems and software Program) to enhance the industrial utilization and research on AI and related areas.

In 2017, Combient expanded to Finland to create a unique Nordic network of corporations, where each member company represents one industry sector and all collaborate in a non-competitive environment to develop cross-sectoral solutions.

The core collaboration activities of the Combient-network have led to the current Combient focus areas of advanced analytics and AI (building data-enabled industrial use cases and their deployment), workforce and organizational development (e.g. workforce upskilling and organizational transformation) and a business case-driven start-up engagement program (Combient Foundry, a venture client).

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

To advance the industrial uptake of advanced analytics and AI at scale, Combient has created a unit, Combient MIX (Machine Intelligence X), to build solutions for individual member companies and to manage cross-sectoral and full value-chain projects for groups of member companies. In these areas, Combient MIX has built advanced analytics solutions for industrial deployment for a number of Combient member companies, continues to provide trusted advisory service to several network companies on their data and technology strategies, and supported the Combient network to build new business and technology partnerships for industrial knowledge sharing and best practices. Combient also facilitates benchmarking activities between members in the fields of AI and data analytics to promote smart procurement and service deployment.

Combient MIX also runs two awareness-raising programs - Data Driver, to educate company leadership on the real benefits of data in their business and Data Science Campus, upskilling selected members of the existing workforce to utilize data-analytics tools to solve real business cases. Both now have global agreements with key Combient member companies and the aim is to educate 8000 workers by 2024.



Another key development area for Combient MIX is the Combient Data as a Service (DaaS)-program, where Combient, its member companies and their value network partners are building an open platform environment for advanced industrial data utilization, knowledge/standards transfer and new industrial competitiveness. For this, Combient has built co-operation initiatives and follows closely the national and EU initiatives such as IDSA and GAIA-X

What are the elements of their success? Describe the framework, program they have used.

In the areas of advanced analytics and AI, the key elements of success for Combient have been the successful creation of a shared resource pool of experts to ease talent attraction, new skills development and intensified knowledge transfer within the network and cross-sectorial between the member companies. This has led to new kinds of industry partnerships for new business development, deploying best practices across industry sector boundaries and finding new opportunities to transform traditional industries towards data-driven organizations taking into account the industry specific needs, business culture and building on real business cases, not on technology push.

After a series of pilots and proofs of concept/value with the Combient network companies, Combient MIX has already developed a working library of sharable practices to move faster from individual projects to industry-grade deployment, thus accelerating the technology uptake. The above-mentioned educational efforts are developed to spur the organizational readiness and maturity to adapt to the changes required by data-driven business development.

Do they need to be sponsored or funded by the government to be successful?

No

What are the key challenges addressed by the initiative

Combient's work on AI and advanced analytics is based on internal development activities and the shared needs of the member companies. Besides these, Combient has actively cultivated partnerships with EU and national initiatives to follow their development, standards creation and dissemination activities. For wider scale and industrial uptake in the Nordics and in the EU, Combient has adopted open innovation methods to promote its best practices for advanced analytics and AI non-Combient companies. This benefits the Combient member companies and their value networks, including supply networks. For example, in Finland most of the small and medium-sized companies are suppliers to large enterprises, of which many are Combient-members in key industry sectors ranging from elevators and smart buildings to forestry and maritime logistics for exports.

Thus, the work initiated within Combient is already creating new opportunities for business, technology advancement and skills development in Sweden and Finland. To spur this impact further, Combient is in 2021 working with an increased number of national research organizations, other industry ecosystems and non-Combient enterprises in areas such as materials innovation and circular economy, where AI and advanced analytics are increasingly the key enabling tools.

Contact (GPAI) for more information

Pekka Ala-Pietilä

6.1.8. Initiative 8 – KI Bundesverband/Germany

German Association of AI Startups

<https://ki-verband.de/>

Short description of the initiative (Structure, funding, key goals)

The KI Bundesverband consists of more than 250 innovative SMEs, Startups and Experts where the focus is on the development and application of technologies based on artificial intelligence. It is the largest AI network in Germany.



Key goal is to enable entrepreneurs to learn from each other's experience and to carry this knowledge into their companies. Through the exchange in the network it contributes to strengthening the innovative power in Germany. Artificial intelligence can only be successful in Germany if it is accepted by the established economy in all areas. The KI Bundesverband contributes to awakening openness for AI innovations in European companies.

It is funded mainly by membership and partner fees.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

- Program to support established companies to integrate AI innovation into their structures and products through access to the AI community and a platform to discover AI companies, identify innovative technologies and become part of the AI ecosystem.
- Strong voice of AI startups in political discussions to promote innovation and AI adoption.
- What are the elements of their success? Describe the framework, program they have used.
- Association of AI Startups and Initiatives in Germany. Established Focus Groups for specific industries and topics (e.g. Health, Industry 4.0, Mobility, Privacy). Foster collaboration between the members.
- Open platform for industry partners (mainly SMEs) to get access to the AI community and content to promote AI adoption.

Do they need to be sponsored or funded by the government to be successful?

No

What are the key challenges addressed by the initiative

- Visibility and Awareness of AI solutions from Startups
- Access for SMEs to AI experts
- Strong voice of AI Startups in political discussions

Contact (GPAI) for more information

Ingo Hoffmann

6.1.9. Initiative 9 – DKFI/Germany

<https://www.dfki.de/en/web/>

Short description of the initiative (Structure, funding, key goals)

The German Research Center for Artificial Intelligence (DFKI) was founded in 1988 as a non-profit public-private partnership. In the field of innovative commercial software technology using Artificial Intelligence, DFKI is a leading research center in Germany.

Based on application-oriented basic research, DFKI develops product functions, prototypes and patentable solutions in the field of artificial intelligence. Research and development projects are conducted in twenty research departments, nine competence centers and eight living labs. Funding is received from government agencies as well as from cooperation with industrial partners.

Apart from the state governments of Rhineland-Palatinate, Saarland and Bremen, numerous renowned German and international high-tech companies from a wide range of industrial sectors are represented on the DFKI supervisory board. The DFKI model of a non-profit public-private partnership (PPP) is considered a blueprint for corporate structure in the field of top-level research.



How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

- DFKI is actively involved in numerous organizations representing and continuously advancing Germany as an excellent location for cutting-edge research and technology. It also supports the academic training of young scientists. At present, approx. 630 highly qualified researchers, administrators and 450 graduate students from more than 65 countries are contributing to approximately 250 DFKI research projects. DFKI serves as a stepping stone to leading positions in industry and successful careers as founders of spin-off companies.
- Access for businesses to AI Infrastructure in Living Labs Testing, evaluation, and demonstration of innovative technologies in comprehensive application scenarios: Advanced Driver Assistance Systems Living Lab, Bremen Ambient Assisted Living Lab, Immersive Quantified Learning Lab (IQL), Innovative Retail Lab, Robotics Exploration Lab, Smart City Living Lab, Smart Factory Living Lab, Smart Office Space Living Lab.
- Access for businesses to knowledge and resources in Competence Centers
Coordination of research activities in particular areas like AI for the Environment and Sustainability, Ambient Assisted Living, Autonomous Driving, Deep Learning, Emergency Response and Recovery Management, Safe and Secure Systems, Smart Agriculture Technologies, Wearable AI

What are the key challenges addressed by the initiative

- Access to AI Infrastructure in Living Labs
- Testing, evaluation, and demonstration of innovative technologies
- Access to Knowledge and resources in Competence Centers
- Coordination of public-private research activities

Do they need to be sponsored or funded by the government to be successful?

Yes

Contact (GPAI) for more information

Ingo Hoffmann

6.1.10 Initiative 10 – National AI Mission/NM-ICPS/India

<https://www.investindia.gov.in/team-india-blogs/national-artificial-intelligence-mission#>

The policy arm of India, NITI Aayog came out with its strategy document for AI (<https://niti.gov.in/sites/default/files/2019-01/NationalStrategy-for-AI-Discussion-Paper.pdf>). The strategy is termed #AIForAll as it is focused on leveraging AI for inclusive growth in line with the Government policy of Sabka Saath Sabka Vikas. The role of the government has been clearly delineated to develop the research ecosystem, promote adoption and address skill challenges. The strategy also flags important issues like ethics, bias and privacy issues relating to AI and envisions the government promoting research in technology to address these concerns. The focus is on sectors like agriculture, health and education where public investment and lead would be necessary.

Short description of the initiative (Structure, funding, key goals)

As part of the national strategy the, DST (Department of Science & technology , Govt. of India) under NM-ICPS Mission(<https://onlinedst.gov.in/NM-ICPS/NMICPSHome.html>) has rolled out a program to spend \$0.5bn over the next 5 years to create 25 technology innovation hubs (TIH) which are expected to create cutting edge AI talent, IP and AI startups as well as enabling India companies to leverage the ecosystem depth. In addition, it is also creating a massive AI compute infrastructure to enable more inclusive AI development under the National AI mission led by MEITY (Govt. of India).



ARTPARK, www.artpark.in (AI & Robotics Technology Park), created in the public-private model as one of the TIH, is creating "DataSetu" to create open data sets in Indic languages, healthcare, education and mobility. Partners can donate, license data and be further connected with the startup ecosystem via ARTPARK Venture studio to help create and support innovative startups for improving quality of life and access to resources in developing countries. It is supported by the government of India (Department of Science & Technology), Indian Institute of Science (IISc) & Industry partner AI foundry (www.aifoundry.ai) with a seed funding of \$30M. It is part of the \$0.5B push by the government of India to create an AI research and innovation ecosystem. It is also incubating a dedicated \$100M venture fund for AI.

What are the key challenges addressed by the initiative

There are four major challenges being addressed by it:

1. AI Technology Development
2. Human Resource & Skill Development (including development of AI technology application tools for education at elementary and high school level)
3. AI Innovation, Entrepreneurship & Start-Up Ecosystem
4. International Collaborations with AI clusters around the globe

6.1.11 Initiative 11 – AI Singapore/Singapore

<https://www.aisingapore.org/>

Short description of the initiative (Structure, funding, key goals)

AI Singapore (AISG) is a national AI program launched by the National Research Foundation (NRF) to anchor deep national capabilities in Artificial Intelligence (AI) thereby creating social and economic impacts, grow the local talent, build an AI ecosystem, and put Singapore on the world map.

The program office is hosted by the National University of Singapore (NUS) and brings together all Singapore-based research institutions and the vibrant ecosystem of AI start-ups and companies developing AI products to perform use-inspired research, grow the knowledge, create the tools, and develop the talent to power Singapore's AI efforts.

AISG is driven by a government-wide partnership comprising NRF, the Smart Nation and Digital Government Office (SNDGO), the Economic Development Board (EDB), the Infocomm Media Development Authority (IMDA), SGInnovate, and the Integrated Health Information Systems (IHIS). AI Singapore has four main pillars:

1. AI Research – to build deep AI research capabilities in Singapore, addressing fundamental issues such as Trustworthy and Explainable AI, Privacy Aware AI, Collaborative AI, Resource Efficient AI and Continuous Learning AI. Research grants are awarded using Open Calls and a two-stage evaluation process.
2. AI Technology – to address major challenges faced by the country using a Grand Challenge approach. The Grand Challenge should be aligned to National Priorities, guided by local and international experts and formulated by AI researchers, domain experts and policy makers.
3. AI Innovation – to drive the adoption of AI by industry in Singapore and grow the local AI talent base. A key vehicle to achieve this is the 100 Experiments (100E) effort where companies bring their problem statements to be solved by using AI. Industry contributes the problem statement, datasets and their manpower. AI Singapore supports with matching AI researchers, AI engineering resources and a matching grant of up to S\$250K. The desired outcome is an MVP within 9 to 18 months and training for the company's own manpower in AI technologies by AI Singapore's experts.
4. AI Maker Space – to develop a community of people interested to "play with AI". It is an environment where people can learn about AI, explore AI products to see how they may be used and to share experiences.



In addition to these 4 pillars, AI Singapore is also involved in AI Talent Development and Certification. The former ranges from online courses, 3-hour workshops to a full-time apprentice program (AIAP), where trainees spend up to 9 months developing full-time to enable them to join the workforce immediately after the apprenticeship period.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

The **100 Experiments** effort, under the AI Innovation Pillar, is directly targeted to support businesses adopt AI. Companies bring their problem statement and manpower to be trained. AI Singapore provides AI Experts and engineering resources to develop an MVP within 9 to 18 months. After that companies would have both the MVP and trained manpower to proceed to the next phase of development.

What are the elements of their success? Describe the framework, program they have used.

Key elements contributing to AI Singapore's success include (a) government funding support in the form of grants for research, development of MVPs that address industry's problem statements and subsidized training courses in AI technologies (b) a ready pool of respected and trusted AI expertise at affordable costs (c) strong and active out-reach to industry, communicating the ability of AI technologies to address a broad range of problems.

What services or support do they provide?

AI Singapore's brief is very broad. For the research community, it serves to identify meaningful research topics and uses open calls to draw in the best research talent to address these problems. For National Challenges, the use of the Grand Challenge approach enables clear problem statements aligned to national priorities to be articulated and attract researchers and domain experts to come together to solve these problems. For industry, the 100 Experiments approach enables companies to get on-board the AI bandwagon directly with the MVP and trained resources as a tangible outcome. For the community at large, the outreach to communicate the power of AI and how it can affect society and industry prepares the ground for the world where AI becomes ubiquitous.

Do they need to be sponsored or funded by the government to be successful?

Yes. This is needed because a large percentage of their work is to increase the capabilities of companies and society to enable them to adopt AI, either to embed AI in their products and services or to use AI-driven services and for them to appreciate the power of AI to create value to society.

What are the key challenges addressed by the initiative?

AI technologies are still in their infancy and there is a lot of hype and sometimes fear mongering. Companies can be uncertain about whether AI can be used for their business and how to implement AI properly. If not communicated properly, society may grow fearful about AI and that would create a backlash which would hamper the deployment of AI generally. So, it is important to have a respected and trusted organization to communicate the story of AI to society.

Contact (GPAI) for more information

Tan Geok Leng

6.1.12 Initiative 12 – Realization of a Smart Society by Applying Artificial Intelligence Technologies (AI in a Smart Society, AISS/Japan)

https://www.nedo.go.jp/english/activities/activities_ZZJP_100137.html

Short description of the initiative (Structure, funding, key goals)

The initiative aims to develop new businesses based on AI technologies which contribute to realization of the vision of Society 5.0 in Japan. The funding, which totals 78 billion JPY (74 million USD) for five years, is provided by a government funding agency (NEDO). It comprises 12 individual projects, each of which is being carried out by a group of private companies and academic institutions. Examples of the 12 individual



projects include AI-driven factories, personalized training for preventing frailty, 3D maps for smart mobility, a data sharing platform for smart food chains, autonomous drones, federated learning, etc.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

The funding provides incentives for diverse players to cooperate to create new businesses. In particular, the funding agency encourages not only technology developers but also companies of potential users to be involved at the beginning phase and it provides a group of advisers from consulting firms, academia and experienced business personnel to guide technology development and to form new business plans.

What are the elements of their success? Describe the framework, program they have used.

The initiative emphasizes the importance of creating new businesses which would be impossible for single players and try to combine seeds-oriented and needs-driven technology development.

What services or support do they provide?

This depends on individual projects, but they all share the common perception that new business should not be mere extension of current businesses

Do they need to be sponsored or funded by the government to be successful?

Yes.

What are the key challenges addressed by the initiative?

The adoption of AI technologies by traditional industry and society requires new frameworks and business models that are not necessarily an extension of current practice.

Contact (GPAI) for more information

Junichi Tsujii

6.1.13. Initiative 13 – AI Hospital System/Japan

<https://www.nibiohn.go.jp/en/sip/publications/>

Short description of the initiative (Structure, funding, key goals)

The AI Hospital System is one of the SIP(Strategic Innovation Programs) projects funded by the Japanese government. The project aims to deploy various kinds of AI technologies in actual hospital environments, which includes robotics, speech recognition, image/text processing, privacy preserving computation, etc. The project is unique in the sense that it consists of diverse stakeholders such as four big hospitals, AI technology providers (such as NTT, Hitachi, UniSys, NEC, etc.), Medical technology providers (Olympus, etc.), and AI Start-ups. It aims to develop an integrated platform for multiple vendors and multiple hospitals.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

The initiative coordinates cooperation between AI technology providers and hospitals. The actual requirements of workers (nurses, medical doctors and consultants of hospitals) have been studied intensively, based on which AI technology providers are developing AI systems. Data resources such as a large size of medical terminologies, dialogue corpus between doctors and patients, and various medical images are constructed and being shared among the members of the project. A common platform has been designed and is being developed in which multiple medical AI vendors can put their products and multiple hospitals can access the products. The platform is endorsed by the Japan Medical Association (<https://www.med.or.jp/english/> : the professional association of medical doctors in Japan).

What are the elements of their success? Describe the framework, program they have used.

Careful investigation of user requirements based on which AI/IT vendors apply their technologies. Close



cooperation with the professional body in the field (Japan Medical Association - JMA).

What services or support do they provide?

Patient-oriented medical services (the goal of the project), sharing common data for AI developers, sharing AI tools by different hospitals, authorization of a professional body (JMA).

Do they need to be sponsored or funded by the government to be successful?

Though they aim to establish self-sustained operation, the initiative is dependent on government funding (for 5 years)

What are the key challenges addressed by the initiative?

Creation of a common framework and data set for AI applications in hospital environments. While AI application in hospital environments is potentially large, AI deployment there has been fragmented due to the large diversity between individual hospital environments, which the project is resolving.

Contact (GPAI) for more information

Junichi Tsujii

6.1.14. Initiative 14 – Japan Deep Learning Association (JDLA)/Japan

<https://www.jdla.org/en/>

Short description of the initiative (Structure, funding, key goals)

JDLA was established in 2017 as a non-profit organization to promote commercial adaptation of deep learning. It provides accreditation with tests for talent development in AI and in particular Deep Learning. As of March 2020, more than 27,000 professionals from private companies in engineering/business domains and students, the majority of whom are in departments other than IT/AI, have been granted the “G-class” accreditation in deep learning. G-class accreditation means that they have enough knowledge on deep learning and are ready to apply the technology in their business fields. It has over 30 corporate members, each of whom provides AI/Deep Learning technologies to client companies.

How has this initiative supported more businesses to invest in AI and adopt/develop new AI powered solutions?

The accreditation programs by JDLA have successfully broadened the base of qualified engineers with proper knowledge and skills of AI and Deep Learning, which helps the adoption of AI technologies in both private and public sectors in Japan.

What are the elements of their success? Describe the framework, program they have used.

A large number of academics voluntarily work for JDLA and they prepare tests for qualification exams. They publish textbooks on deep learning and provide series of tutorials and workshops. Corporate members and industrial sponsors give financial support for their activities.

What services or support do they provide?

They organize qualification exams once every 3 months and occasional workshops and tutorials.

Do they need to be sponsored or funded by the government to be successful?

No.

What are the key challenges addressed by the initiative?

Lack of qualified engineers in the field of AI and Deep Learning.

Contact (GPAI) for more information

Junichi Tsujii



6.2. Public sector Initiatives

6.2.1. Infrastructure & Trust Platform

6.2.1.1. Initiative 1 – Sharing of AI Bridging Cloud Infrastructure (ABCI), Japan

Short Description of the Initiative

AI Bridging Cloud Infrastructure (ABCI) is the world's first large-scale Open AI Computing Infrastructure, constructed and operated by the National Institute of Advanced Industrial Science and Technology (AIST) with the support of METI, Japan.

How has this initiative supported innovation and commercialization in AI?

ABCI has a world-class computing and data processing power (#5 at TOP500 supercomputer ranking in June 2018), with an open and dedicated computing infrastructure for developing algorithms and software for AI and Big Data applications. It serves as a platform to accelerate joint AI R&D with industries, academia and government.

What are the elements of success? What makes the program successful?

ABCI cloud services started in August 2018 and have been used by hundreds public/ private organizations and thousands of researchers/ engineers for AI development.

6.2.1.2. Initiative 2 – National Supercomputing Centre (NSCC) in Singapore

Short Description of the Initiative

NSCC Singapore was established in 2015 and manages Singapore's first national peta-scale facility with available high-performance computing (HPC) resources. As a National Research Infrastructure funded by the National Research Foundation (NRF), NSCC supports the HPC research needs of the public and private sectors, including research institutes, institutes of higher learning (IHLs), government agencies and companies.

How has this initiative supported innovation and commercialization in AI?

NSCC has been tasked to leverage HPC to advance Singapore's strategic interests, boost national initiatives and facilitate industry transformation using HPC in areas like visualization, modelling, simulation, big data analytics and artificial intelligence.

What are the elements of success? What makes the program successful?

As a national strategic technological platform, NSCC has the mandate to enhance industry competence, capacity and competitive advantage in the use of HPC in all relevant fields such as computational science, analytics, engineering, advanced manufacturing, genomics, biomedicine and healthcare, among many others. NSCC is thus keen to work with domain experts and coordinators in various Research & Development fields to achieve its aims. NSCC is committed to helping educational institutions train future generations of HPC-enabled workforce to help Singapore maintain its competitiveness.

6.2.1.3. Initiative 3 – Establishing National AI Resource Platform (NAIRP) of India by the Ministry of Electronics & Information Technology in India

Short Description of the Initiative

NAIRP is a web-based system under development to search and browse AI resources and to provide a learning platform as well as offering cloud-based computation on the platform. The project is sponsored by MHRD, Govt. of India (as a sub-project of the National Digital Library of India), and Amazon Web Services, Inc.



How has this initiative supported innovation and commercialization in AI?

Resources from the National Digital Library of India (NDLI), external websites such as AWS, GitHub, NPTEL, Kaggle, Wikipedia, YouTube, etc. and many others, participating institutes and organizations, will be available to users for domain-aware searches. The domain-awareness of the search will be supported by a manually curated ontology covering the different application areas, thematic areas and fundamental areas in the field of AI and ML. The platform will also provide an intelligent mechanism of browsing-by-relevance over the resources.

What are the elements of success? What makes the program successful?

This program has provided the necessary support and mentorship for incubations of students:

- Learn in NAIRP provides the means to deliver courses related to AI and ML, and any user will have free access to these courses. The delivery of the courses will be supported with a cloud-based computation platform for working out the exercises and assignments from the courses.
- Compute in NAIRP provides a cloud-based computation platform so that its users have easy access to computational resources required for learning and practicing the techniques of AI & ML

6.2.1.4. Initiative 4 – AI Sector Deal, United Kingdom

Short Description of the Initiative

The AI Sector Deal – a £1 billion package of support from government and industry - is designed to boost the UK's global position as a leader in developing AI and related technologies. It is taking tangible actions to advance the Industrial Strategy's AI and Data Grand Challenge and ensure the UK is the leading destination for AI innovation and investment.

The initiative focuses on 5 areas, Ideas (research), People (talent), Infrastructure, Business Environment and Places (community).

How has this initiative supported innovation and commercialization in AI?

This initiative has helped to establish a national AI council, create new training centers and scholarships for AI, facilitated data sharing and provided funding for a large range of initiatives.

What are the elements of success? What makes the program successful?

This initiative has created strong momentum in the AI sector, and a raft of major announcements has promoted the positive use of AI across the UK.

6.2.1.5. Initiative 5 – AI for Humanity, France

Short Description of the Initiative

The National AI strategy gathers three main axes: talent (to have the best expertise in AI), dissemination (to spread AI throughout the economy and administration) and ethics (to initiate a dialogue between performance and humanity).

How has this initiative supported innovation and commercialization in AI?

This initiative has initiated 4 Interdisciplinary Institutes for Artificial Intelligence: MIAI in Grenoble, 3IA@Côte d'Azur in Nice, PRAIRIE in Paris and ANITI in Toulouse, promoted programs to support talent, increased the computing resources dedicated to AI and facilitated access to infrastructures, and strengthened bilateral, European and international cooperation

What are the elements of success? What makes the program successful?

Inria, the French national research institute for the digital sciences, is committed to playing a prominent role as coordinator of the national AI strategy. The institute is responsible for its implementation and regularly publishes updates on the status of the strategy. Key success factors are the outcomes of the four



interdisciplinary institutes in terms of: excellence in research and education; attractiveness (in training, attracting and retaining top talent); ability to bring together academic, industrial, and international partners, conducting interdisciplinary AI research; the ability to perform collaborative research with industry and applications, playing an active role in the creation and growth of start-ups.

6.2.1.6. Initiative 6 – AI Singapore’s Synergos, Singapore

Short Description of the Initiative

AI Singapore (AISG) has developed Synergos, a distributed system, to enable organizations to participate in Federated Learning. It seeks to bring to industry the benefits of collaborative machine learning while respecting data privacy.

How has this initiative supported innovation and commercialization in AI?

Synergos enables different parties to work together to train a machine-learning model without exposing the data of each individual party. This facilitates industrial collaboration, especially in industries where data is highly sensitive.

6.2.1.7. Initiative 7 – AI Hub, Korea

Short Description of the Initiative

The AI Hub is a one-stop platform that provides data, software algorithms, and high-performance computing for the development of AI technologies, products, and services. Through the AI Hub, the government plans to release a total of 180 types of AI data, for AI education purposes, including generic data such as Korean audio files and Korean character images, as well as field-specific data such as x-rays and autonomous driving data within 2020. Additionally, the government aims to extend this data pool by constructing another 1300 types of data by 2025.

How has this initiative supported innovation and commercialization in AI?

Due to the high cost and the time-consuming aspect of the data collection process, many AI researchers (individuals, SMEs, and venture companies) experience difficulty accumulating data. In addition, insufficient computing resources and low-level algorithms lowers the efficiency of AI learning. In this context, AI Hub aims to foster autonomous and creative innovation by reducing the entry barriers for the development of advanced AI products and services through the government-led provision of the most needed resources (data, algorithm, high-performance computing power).

What are the elements of success? What makes the program successful?

The most significant element of success is the development and release of massive AI educational data. We carried out extensive demand surveys to select types of public data, thus inducing a demand-driven AI Innovation, which is another element of success.

6.2.2. Coordination of Resources

6.2.2.1. Initiative 8 – The USA has established the Department of Defense’s Joint AI Center to coordinate AI research

Short Description of the Initiative

DOD’s Joint AI Center (JAIC) is the Department’s AI Center of Excellence that provides tools and expertise to help DOD harness AI across all dimensions: land, sea, air, and space. JAIC was established in 2018.

How has this initiative supported innovation and commercialization in AI?

The key enabler of JAIC’s ability to scale across the Department is the [Joint Common Foundation \(JCF\)](#), a cloud-enabled environment that is a single platform for coders to build models, work with data, and



develop AI systems. JCF is essentially a plug-and-play foundation for AI collaboration. For example, one DOD entity might develop an AI algorithm to identify pickup trucks and put all their full-motion videos in one spot on the JCF. A different DOD entity can then use that same algorithm and data, but tweak the algorithm a little bit and combine it with some of their data on other types of vehicles to meet their own unique needs.

What are the elements of success? What makes the program successful?

Having a central AI platform allows DOD to better share data that facilitates innovation and the rapid adoption of AI across the Department. JCF provides all the tools, frameworks, standards, processes, and other resources that DOD entities need to build, test, and field AI projects and applications.

6.2.2.2. Initiative 9 – India created the National AI Portal, a one-stop platform for all AI related advancements

Short Description of the Initiative

INDIAai (The National AI Portal of India), a joint venture by MEITY (the Ministry of Electronics and Information Technology), NeGD (National E-Governance Division is an Independent Business Division (IBD) established by the Ministry of Electronics and Information Technology within Media Lab Asia to undertake Program Management of NeGP) and NASSCOM (the National Association of Software and Service Companies, which is a trade association of Indian Information Technology and Business Process Outsourcing companies), has been set up to prepare the nation for an AI future. It is the single central knowledge hub on artificial intelligence and allied fields for aspiring entrepreneurs, students, professionals, academics, and everyone else. The portal focuses on creating and nurturing a unified AI ecosystem for driving excellence and leadership in India's AI journey, to foster economic growth and improve lives through it.

How has this initiative supported innovation and commercialization in AI?

It provides an ecosystem to nurture starts-ups in areas of agriculture, health and financial technology (fintech). It establishes a cohesive environment of learning opportunities in educational institutions, thereby facilitating the growth of a new generation of entrepreneurs and a platform for investment funding to galvanize the start-up community.

C-DAC (Centre for Development of Advanced Computing) under the aegis of the Government of India will provide the infrastructure comprising 210 AI PF systems along with associated state of the art software libraries at nominal costs. It will also provide necessary handholding for start-ups and MSMEs (Micro, Small and Medium Enterprises) to experiment with their innovative ideas and flourish.

What are the elements of success? What makes the program successful?

Interaction with start-ups revealed that they are constrained by the prohibitive cost of commercial AI cloud services and also hindered by lack of expertise in areas like cyber security and marketing their products to realize a successful business venture. Factoring in all these, C-DAC is providing the necessary ecosystem.

We would like to believe that removing the hurdles faced by the entrepreneurs will pave the way for their success.

6.2.2.3. Initiative 10 – Disseminating Information/Knowledge through AI Japan R&D Network in Japan

Short Description of the Initiative

AI Japan R&D Network ("AI Japan"), is a consortium consisting of universities and public research institutes that are actively engaged in AI R&D in Japan. It was established in December 2019 by AIST (secretariat), RIKEN and NICT with the support of the Cabinet Office, MEXT, METI and MIC. The aim of AI Japan is to stimulate AI R&D activities in Japan and the world by sharing information/ knowledge and



integrating wisdom on AI.

How has this initiative supported innovation and commercialization in AI?

AI Japan provides integrated and unified information dissemination on Japan's R&D activities to inside/outside the country and opportunities to exchange opinions among AI researchers.

What are the elements of success? What makes the program successful?

Currently more than 100 universities and public research institutes are joining AI Japan.

6.2.2.4. Initiative 11 – Singapore launched AI Singapore (AISG), a national AI program, to anchor deep national capabilities in AI

Short Description of the Initiative

AISG is a National AI Program Office sponsored by the National Research Foundation and hosted by the University of Singapore. The Program Office was officially started in June 2017. To deliver the AI impact for the country, AI Singapore brings together universities, industrial companies and government to do AI development activities guided by real-life needs.

How has this initiative supported innovation and commercialization in AI?

AISG has four key pillars to support innovation and commercialization in AI:

- AI research is geared toward building deep AI research capabilities in Singapore through fundamental research.
- AI technology is focused on creating significant economic and social impacts by tackling national or global challenges using AI.
- AI industry innovation accelerates the adoption of AI technology in the industry through proof-of-concept projects and talent development.
- AI Makerspace help industries jump-start their AI journey by providing access to resources for experimentation, such as curated datasets from industry and government, cutting-edge AI tools, and supercomputing resources specialized for AI workloads.

What are the elements of success? What makes the program successful?

AI talent is scarce. With the formation of AISG, it can coordinate and direct all AI R&D activities to better produce tangible AI research outputs, create new industries and drive demand for new jobs and skills.

6.2.2.5. Initiative 12 – Mexico created IA2030Mx, a multisectoral coalition made up of professionals, academic institutions, companies, startups, public agencies and other key actors in the digital ecosystem and Artificial Intelligence (AI)

Short Description of the Initiative

IA2030Mx is a multisectoral coalition made up of professionals, academic institutions, companies, startups, public agencies and other key actors in the digital ecosystem and Artificial Intelligence (AI) in Mexico.

How has this initiative supported innovation and commercialization in AI?

IA2030Mx seeks to add the participation of all the states of Mexico to the movement, create a National AI Agenda for 2030 and strengthen state and local ecosystems, as well as contextualizing and promoting the OECD AI principles signed by Mexico.

What are the elements of success? What makes the program successful?

The members of this movement have worked since the beginning of 2018 under a philosophy of co-responsibility of government, academia, industry and civil society, seeking that Mexico does not lag behind in the 4th Industrial Revolution, strategically taking advantage of the benefits of AI and mitigating the possible ethical and social risks.



6.2.2.6. Initiative 13 - the UK created the NHS AI Laboratory (AI Lab) to accelerate the safe and effective adoption of AI in healthcare

Short Description of the Initiative

The NHS Artificial Intelligence Laboratory (AI Lab) was created to fully harness AI benefits and use AI safely and ethically at scale by bringing together government, health and care providers, academics and technology companies.

How has this initiative supported innovation and commercialization in AI?

The NHS AI Lab creates an environment for collaboration and co-creation by bringing together programs which address significant barriers to the development and deployment of AI systems in health and care. This will unlock the potential of AI to revolutionize healthcare, whilst ensuring that NHSX can determine the right guidance and regulations to protect patients.

What are the elements of success? What makes the program successful?

NHSX is working in partnership with several government and NHS partners to deliver NHS AI Lab programs and also provides funding to support projects that look to use AI to address the detection of disease and research into multiple long-term conditions

6.2.2.7. Initiative 14 - France launched in 2017 the #FranceIA strategic committee in order to mobilize all members of the French artificial intelligence (AI) community and bring together the many emerging initiatives in France to define a concerted national strategy.

Short Description of the Initiative

The objectives of this initiative are to:

- Clarify the current debate on artificial intelligence by highlighting the challenges and the future potential that the mastery of these technologies represents.
- Mobilize the AI community in France and internationally.
- Define an action plan and mobilize funding, in particular through the Investments for the Future program.
- Affirm France's leadership in Europe and around the world.

17 Working Groups gathered more than 50 proposals that were discussed, paving the way for supported concrete actions:

- Coordination by France of an application for a "flagship project of emerging technology" ("FET flagship") on AI, co-financed by the European Union (1 billion euros).
- Launch of a new program mobilizing research institutions to identify, attract and retain the best talents in AI, as part of the Priority research programs action of P.I.A.3.
- Funding of a shared infrastructure for research.
- Constitution of a public-private consortium with a view to identifying or creating an interdisciplinary center for artificial intelligence.
- Mobilization of public (Bpifrance, P.I.A.) and private resources to achieve within 5 years, the objective of investing in 10 French start-ups for more than 25 million euros each.
- Mobilization of the automotive, customer relations, finance, health and rail transport sectors so that each sector defines an AI sector strategy by the end of 2017.
- Launch of a call for projects for sectoral data sharing platforms for 3 to 6 sectors, by the end of 2017.
- Conclusion of the ethical debate on "algorithms" led by the CNIL in October 2017.
- Launch of a consultation with France Strategy on the issue of the effects of artificial intelligence on employment.



What are the elements of success? What makes the program successful?

Several private and/or public initiatives were realized. For example, Hub FranceIA (an Association founded in 2017 by independent members of the French AI ecosystem), Objectif IA (created by the Institut Montaigne).

Creation of 4 Interdisciplinary Institutes with high private-public funding (~€ 60 Million per year each).

6.2.2.8. Initiative 15 - Presidential Committee on the Fourth Industrial Revolution (PCFIR), Korea

Short Description of the Initiative

The PCFIR deliberates upon and coordinates important policy matters pertaining to the development and acquisition of new science and technology, including artificial intelligence (AI) and data technology, as well as new industries and services necessary for the Korean society to adapt to the 4th Industrial Revolution. In particular, from 2020, as a pan-national AI committee, PCFIR will actively support the implementation of the “National master plan for AI” and encourage AI application in diverse sectors of society through public-private partnerships.

How has this initiative supported innovation and commercialization in AI?

As an institution that deliberates and coordinates nationwide AI agendas that are difficult to be handled by individual ministries, PCFIR induces rapid development of products and services as well as the commercialization of AI technologies through practical policy suggestions, overcoming ministerial boundaries.

What are the elements of success? What makes the program successful?

PCFIR is a private-led advisory board consisting of 21 civilian members and 5 government members. This multilateral characteristic allows the convergence of various stakeholders' opinions during the process of innovation and commercialization of AI. This prevents multiple potential problems that can arise from conflicts of interest among the stakeholders. This engagement of multiple stakeholders and early coordination of interests are also other elements of success.

6.2.3. AI Literary and Talent Development

6.2.3.1. Initiative 16 - AI Singapore (AISG) created inclusive, generational AI development programs in Singapore

Short Description of the Initiative

AISG's talent development program started with the AI Apprenticeship Programme (AIAP) to develop a pipeline of local AI engineers to build up AISG's own AI engineering capabilities and the industry. As AISG engaged the industry with our 100Experiment industry development program, we found a lot of misconception and misunderstanding about AI in the wider industry, and hence AISG created an AI for Everyone (AI4E) program to introduce everyone to modern AI technologies and applications, and to be savvy consumers of AI products and services. AISG subsequently also launched AI for Students (AI4S) and AI for Kids (AI4K) to ensure future generations are AI-ready.

How has this initiative supported innovation and commercialization in AI?

Innovation and commercialization of AI requires trust, confidence, and adoption from the general public. The suite of talent development programs - from AI4K to AI4E - helps to increase the overall AI literacy in Singapore and increase the adoption of AI applications, thereby supporting commercialization in AI.

The AIAP, which helps to deep skill professionals into AI engineers, supports innovation of AI by having apprentices working on real-world industry projects model deployment into production.



What are the elements of success? What makes the program successful?

The inclusive, generational AI development program ensures that there is an appropriate program for anyone, no matter their level of education, life-stage, and career ambitions.

6.2.3.2. Initiative 17 - The UK created conversion courses, masters-level apprenticeships, and an industry-funded AI master program

Short Description of the Initiative

The government has joined forces with the Office for Students, universities and industry partners to create a fund of up to £24 million to increase the number of highly skilled workers in AI and data science roles. The move will enable 2,500 people to develop new digital skills or retrain to help find new employment in the UK's cutting-edge AI and data science sectors.

How has this initiative supported innovation and commercialization in AI?

Applicants could include people returning to work after a career break and looking to retrain in a new profession, under-represented groups in the AI and digital workforce. 1000 scholarships will specifically target the female, black and disabled demographics.

What are the elements of success? What makes the program successful?

Successful students will have flexible access to study and course content so they can fit their studies around their daily lives. Students will undertake paid work placements to help maximize their employment opportunities at the end of their course which could see them land roles as machine learning engineers, data scientists, research scientists or AI architects.

6.2.3.3. Initiative 18 - India's Center Board of Secondary Education (CBSE) partnered with industry to make AI education accessible to students

Short Description of the Initiative

The Central Board of Secondary Education (CBSE) announced the integration of Artificial Intelligence (AI) in the high school curriculum for Grade XI and XII for the current academic year (2020 – 2021) has been developed in collaboration with IBM.

The curriculum is part of the CBSE's Social Empowerment through Work Education and Action (SEWA) program. The initiative is aimed at helping students to learn AI skills for social good.

How has this initiative supported innovation and commercialization in AI?

This program will inculcate the necessary skills & knowledge right from high school level. Thus, it will allow Grade XI & XII students from all streams, in addition to Computer Science, to build the foundation for themselves to be AI-ready, thereby providing a head start for the students.

What are the elements of success? What makes the program successful?

The curriculum is built around a framework focused on base strands of knowledge (basics, history, applications), skills (design thinking, computational thinking, data fluency, critical thinking) and values (ethical decision-making, bias) in AI.

6.2.3.4. Initiative 19 - Japan created the AI Quest Program to enable peer-to-peer learning

Short Description of the Initiative

"AI Quest", implemented by METI, Japan since 2019, is the new program for the training of AI talent to address the increasing demand of AI talents who can solve corporate problems and promote innovations through the use of AI and data. The number of participants in FY2019 is around 200. This is expected to increase to around 600 participants in FY2020.



How has this initiative supported innovation and commercialization in AI?

This “AI Quest” is not a program where teachers lecture participants in one direction, but one in which participants are involved in a "practical learning place" centered on case studies based on actual corporate issues and learn from one another by discussing their own experience and ideas.

What are the elements of success? What makes the program successful?

The program focuses on Project-based Learning (PBL), a teaching method in which participants exchange information and work together to solve assigned challenges, rather than providing instructor-based classroom lectures. It provides all training programs online and recommends that participants learn from each other and teach each other for efficient learning.

6.2.3.5. Initiative 20 - Japan created the AI Quest Program to enable peer-to-peer learning

Short Description of the Initiative

The government announced a nationwide plan to strengthen digital literacy to successfully adapt to the AI era which is expected to be accelerated post COVID-19:

1. develop an online AI education platform to prepare for a non-contact society.
2. build a society with access to AI and SW education for all.
3. prepare for the transition to an AI economy and AI society through AI education of all working sectors.
4. foster future leaders with an AI and SW centered educational reform.

How has this initiative supported innovation and commercialization in AI?

It promotes the spread of AI by improving the entire nation's AI literacy, regardless of the working sector, region, or age. This in turn, accelerates the application of AI in daily activities by reducing social insecurity and increasing responsiveness towards AI.

What are the elements of success? What makes the program successful?

Provision of customized learning according to one's working sector and life-cycle stage promotes the efficacy of AI education, and the establishment of an online AI education platform will allow for virtual, real-time learning in the COVID-19 era. In particular, the setting up of 1000 "digital competence centers" in local governments gives access to step-by-step AI and SW education to all citizens nationwide, near their place of residence.

6.2.3.6. Initiative 21 – Center for Industrial Innovation in Artificial Intelligence Engineering in the State of Yucatan, Mexico

Short description of the initiative (Structure, funding, key goals).

The objective of the Center is to contribute to the training of specialized human talent and to generate intelligent goods and services designed to address the demands of the industry under a collaborative model and the participatory governance of the triple helix (academia, industry and research)³⁰. The Center received public funding from the Mexican Ministry of Economy³¹ and private financial contributions. Today, the Ministry continues to support the Center through promotional activities.

How has this initiative supported more businesses to invest in AI and adopt / develop new AI powered solutions?

The Center is designing and exploring new ways to attract and develop talent based on award scholarships to receive training on best practices in ICTs' technological innovation. The scholarship holders may, potentially, be selected to join the ranks of the Center or other large institutions, where they could work on the design of complex artificial intelligence algorithms for products, processes, and services.

³⁰ Center for Industrial Innovation in Artificial Intelligence Engineering in the State of Yucatán: <https://smartia.org.mx/>

³¹ It is a public policy that promotes the Information Technology (IT) sector in Mexico and the innovation in strategic sectors.



What are the elements of their success? Describe the framework, program they have used.

The success of this initiative is due to the coordination of efforts for the training of talent, the generation of knowledge and the development of businesses. As a result, the practices and business models of companies in Yucatan take into consideration current scenarios where talent and continuous training of expert personnel allows for the generation of value for their clients.

Do they need to be sponsored or funded by the government to be successful?

Currently, the Center is financed by private resources. Government support is complementary and aligned with the vision of sustainability of these initiatives.

What are the key challenges addressed by the initiative?

Promoting greater collaboration to generate new alliances with relevant players such as industry and academia, as well as strengthening the awareness on the relevance of developing a local industry in Artificial Intelligence

6.2.4. Regulations

6.2.4.1. Initiative 22 - White House AI Regulatory Review in the USA

Short Description of the Initiative

The US has introduced an Executive Order on “Maintaining American Leadership in Artificial Intelligences”. It informs the development of regulatory and nonregulatory approaches regarding technologies and industrial sectors that are empowered or enabled by artificial intelligence (AI) and considers ways to reduce barriers to the development and adoption of AI technologies.

How has this initiative supported innovation and commercialization in AI?

This initiative has provided key guidance to federal agencies to ensure that their actions, including regulatory, that involve AI, don't unduly limit AI development and adoption.

What are the elements of success? What makes the program successful?

First, the order was informed by a number of diverse stakeholders. Second the order is from the Executive Office of the President, overseen by the Federal Office of Management and Budget, so that agencies must pay attention to it.

6.2.4.2. Initiative 23 - Japan Published Machine Learning Quality Management Guidelines

Short Description of the Initiative

The first version of Machine Learning Quality Management Guidelines, a technical document, was published by the AIST in June 2020 through discussions of more than 20 experts with the support of METI, Japan.

How has this initiative supported innovation and commercialization in AI?

One of the problems of applying machine-learning technologies to society is the difficulty in estimating and assuring its quality. The aim of the guidelines is to establish a basis for quality goals for machine learning-based products/services and to provide procedural guidance for realizing quality through development process management and system evaluations, and to reduce accidents and/or losses caused by AI malfunctions in society.

What are the elements of success? What makes the program successful?

These guidelines will be the basis for discussions for international technical standards for the future of AI governance.



6.2.4.3. Initiative 24 - Model AI Governance Framework in Singapore

Short Description of the Initiative

Singapore has released the second edition of Model AI Governance Framework to provide detailed and readily implementable guidance to private sector organizations to address key ethical and governance issues when deploying AI solutions. The Model Framework focuses primarily on four broad areas: internal governance structures and measures, human involvement in AI-augmented decision-making, operations management, and stakeholder interaction and communication.

How has this initiative supported innovation and commercialization in AI?

The Model Framework provides detailed and readily implementable guidance to private sector organizations to address key ethical and governance issues when deploying AI solutions. By explaining how AI systems work, building good data accountability practices, and creating open and transparent communication, the Model Framework aims to promote public understanding and trust in technologies.

What are the elements of success? What makes the program successful?

The Model Framework takes a sector- and technology-agnostic approach that can complement sector-specific requirements and guidelines. By explaining how AI systems work, building good data accountability practices, and creating open and transparent communication, the framework aims to achieve its goals of promoting public understanding and trust in technologies.

6.2.4.4. Initiative 25 - Creation of Centre for Data Ethics and Innovation to support the development of AI in the UK

Short Description of the Initiative

The Centre for Data Ethics and Innovation (CDEI) is an independent advisory body set up and tasked by the UK Government to advise on how the UK could maximize the benefits of technologies such as AI.

How has this initiative supported innovation and commercialization in AI?

CDEI brings people together from across sectors and society to shape practical recommendations for the government, as well as advice for regulators, and industry, that support responsible innovation and help build a strong, trustworthy system of governance.

What are the elements of success? What makes the program successful?

CDEI has a unique role with a cross-sector remit. They are a connector between government and wider society and have a unique mandate to advise the government. They convene and build on the UK's vast expertise in governing complex technology, innovation-friendly regulation and its global strength in research and academia.

6.2.5. Support for Innovation and Commercialization

6.2.5.1. Initiative 26 - AI Singapore's 100 Experiments to support industry innovation in Singapore

Short Description of the Initiative

100 Experiments (100E) is AI Singapore's flagship program to solve industries' artificial intelligence (AI) problem statements and help them build their own AI teams. There are two tracks under 100E: 100E For Research (100E4R) and 100E For Industry(100E4I). Both programs provide support for organizations to develop and adopt AI solutions.



How has this initiative supported innovation and commercialization in AI?

Under 100E4I, the industry problem statement research component is less intensive, and the AI Singapore engineering team will be able to undertake the project end-to-end assisted by a Principal Investigator on a consultancy basis if and when required. The project will be completed with the delivery of an MVP in 9 months.

Under 100E4R, the industry problem statement is novel and requires extensive research by the PI and a MVP can be delivered within 18 months. The PI will work on the problem statement with his team of postdoctoral researchers, Research Fellows, PhD students and/or Research Assistants alongside the AI Singapore engineering team.

What are the elements of success? What makes the program successful?

An organization can propose 100E problem statements where no commercial off-the-shelf (COTS) AI solution exists, but they can potentially be solved by Singapore's ecosystem of researchers and AI Singapore's engineering team within 9 to 18 months.

AI Singapore will provide 1:1 funding of up to SGD\$250,000 per 100E project for the Principal Investigators (PI) from Singapore's autonomous universities and A*STAR research institutes to work on the organization's problem statement. The organization is required to match the funding amount through in-kind (AI/engineering/IT/domain manpower) and cash contributions.

The developed AI model will be deployed in the organization by the end of the program and the organization is encouraged to make a conditional offer of hire to the apprentices assigned to the organization's 100E projects.

6.2.5.2. Initiative 27 - AI+X, Korea

Short Description of the Initiative

AI+X is a project designed to generate significant results perceptible to the citizens through the convergence of AI and each industry based on big data accumulated by the public sector. A representative result of this project is Dr. Answer's development in the healthcare sector. Dr Answer is an AI-based solution development project for disease prediction, diagnosis, and treatment launched by a consortium composed of 25 hospitals and 21 ICT related companies.

How has this initiative supported innovation and commercialization in AI?

It provides business opportunities to national AI companies and builds a public-private cooperation ecosystem allowing companies from diverse sectors to cooperate with professional AI companies and government institutions.

What are the elements of success? What makes the program successful?

The most critical element of success is the development of highly feasible public projects that require public-private cooperation. With an increasing number of companies participating in the consortium, the project will accumulate multiple empirical examples and deduce regulatory issues to apply to future regulatory matters regarding the production of products and services and the commercialization process.



6.3. GPAI Innovation & Commercialization Working Group Illustrative Mandate

Illustrative list, to be discussed and prioritized by the working group members.

Scope of the Working Group

- The **Innovation and Commercialization Working Group** will study and recommend practical tools and methods that enable private actor and research organizations to drive international collaboration on AI R&D and innovation, to develop research outputs into products and processes, and to transfer these results to industry for commercialization, with a special focus on SMEs.
- In the first years, the working group may focus on specific issues related to establishing trust in AI systems that are commercialized, since trustworthiness over the whole life-cycle of the product is one of the key challenges for bringing AI research to market.
- It will also focus on innovation and reducing time to market, in line with our shared values, and the importance of R&D to address some of our mutual, most pressing challenges [US: such as the prevention of future pandemics].

Deliverables to be presented at the Multistakeholder Experts Group Plenary (December 2020)

- Create a new deliverable to address new business models, new services, new ideas and new ecosystems made possible by AI. This first topic would be about new ways of doing business (example: pooling data together to train AI models). New ways for companies to collaborate (R&D, innovation, value sharing, data sharing ...). Business-to-consumer, business-to-business and Public-to-Citizen business models should be considered.
- What are the mechanisms the private sector could put in place to promote AI innovation, commercialization and adoption (example: marketplaces, data sharing ...)? This deliverable should address, among others, the blocking issue for startups/SMEs of accessing data: what mechanisms could be put in place to foster collaboration between private companies to pool and share data? in an encrypted way? How to organize those pools? By sector? How to moderate the access? How to make data available to SMEs and startups? Which incentives to foster data sharing? Which standards to create? How to facilitate access to computing facilities?
- What could the government do, and should it not do, to support innovation, commercialization and adoption of AI by sector and size (example: sharing public data, putting in place procurement processes to support innovation or startups, ...)?

Deliverables to be advanced in the Medium-Term

- State-of-the-art review on the auditability, certification and reliability of AI algorithms and systems specific to industrial and commercial products and services;
- State-of-the-art review on approaches to human-machine interactions in the context of business-to-consumer and business-to-business relationships (e.g. HMI for autonomous cars, robots, medical assistants, recommendation engines for professionals, etc.);
- Guidance and assessment of standards and examples of “ethical by design” development of industrial and commercial AI systems;



- Research and analysis of emerging issues for AI projects related to intellectual property as experienced by firms of various sizes with an aim towards developing strategies to help them address these issues. Assess potential, business-to-business intellectual property arrangements for products that are generated by AI systems, and implement sandboxes related to such arrangements.
- Conduct experimentations on the certification and reliability of AI algorithms and systems that enable the transition from R&D labs to products.
- Further research on the global race for talent in the field of AI, including on global wage differences and the recruitment of academic experts by the private sector.

