Brussels, 15 January 2020

Orgalim Manifesto: a European Agenda on Industrial AI

EXECUTIVE SUMMARY

Artificial Intelligence (AI), has recently benefited from a number of technological advances, making it a powerful enabler of Europe's Technology Industries' digital transformation. Together with sustainability, digital transformation is the main driver of industrial growth.

International competition is enormous, and massive investments are being made in other regions of the world, building on either a huge data-based economy or on very large State investments. Europe has a number of assets which it can, when taking swift action, use to develop its own approach to AI, which can both boost its economy's competitiveness and contribute to deploying solutions to societal issues as described in the United Nations Sustainable Development Goals.[1]

Orgalim, Europe's Technology Industries, strongly supports these developments and strives to shape an enabling EU framework built on both Europe's strengths in the industrial space and its European values.

As two-thirds of the value created by AI is contributable to the B2B segment, we recommend that policymakers focus on supporting our industries as providers of world-leading Trustworthy AI solutions for the world market. We are convinced that this approach will become a competitive differentiator for Europe's industries to become global leaders and position our industries as world innovators in 'Trustworthy-AI'.

To achieve this core objective of the EU, Orgalim and its members want to share this Manifesto, in order to provide some insights into what Industrial AI entails. We highlight the following important building blocks that are required to achieve this, grouped in 4 chapters and outlining 13 policy recommendations to ensure success:

Strong Internal Market and legal framework

1. Orgalim believes safety and liability legislation is currently fit for purpose and appropriate, including when it comes to AI development.
2. A framework for the definition and governance of regulatory sandboxes must be developed by the EU and stakeholders to offer a harmonised approach by Member States.
3. Orgalim considers that, given the complexity of business cases in various value chains, the contract rather than the law should be the basis concerning data exchange and the overall flow of data in Business-to-Business (B2B) relationships.

Accompanying measures: investments in R&D and capital, innovation, skills

4. Member States should adopt the EU Multiannual Financial Framework to allow for the full deployment of the next series of EU programmes (Horizon Europe, Digital Europe and the Structural Funds), as well as the new InvestEU Fund, which could leverage the cooperation between manufacturers and the financial sector to massively invest in innovative projects.
5. The B2B sectors require that European and national public research are focused on AI applications in industry, addressing industry-specific AI challenges.
6. Facilitate the deployment of AI throughout the entire European industry, in terms of raising awareness and providing support to development, deployment and training/talent acquisition.
7. The EU should launch a "master plan for training and education", to upgrade the general education level in Science, Technology, Engineering and Maths (STEM), and to develop curricula integrating digital and physical engineering.

Fostering trust in AI solutions with ethics, privacy, security and dialogue being core elements

8. The ethical guidelines of the HLEG on AI should be seen as a general basis which should be further adapted and simplified in close cooperation with the relevant industrial sectors. This would then be used by the EU and the Member States to promote an international approach towards ethical and Trustworthy AI.
9. The proper implementation of the GDPR requires a general guidance by the Commission to avoid a fragmented application by the Member States Data Protection Authorities.
10. A holistic approach to cybersecurity policy should be the goal, shaping an enabling, consistent and coherent cybersecurity framework for the EU.
11. Continue to foster dialogue between the social partners,and to inform and organise a dialogue with the public at large, for example by promoting free AI training available to the public to update citizens' basic knowledge.

A strong global outlook

12. An international approach towards trustworthy AI should be promoted by the EU and the Member States.
13. Internationally recognised and consensually created international standards need to be developed to harmonise technical standards on AI.

We provide below the rationale for these "recommendations".

Orgalim aisbl
BluePoint Brussels
Boulevard A Reyers 80
B1030 | Brussels | Belgium

+32 2 206 68 83
secretariat@orgalim.eu
www.orgalim.eu
VAT BE 0414 341 438

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INTRODUCTION – WHY AI IS IMPORTANT TO ORGALIM AND ITS MEMBERS

The opportunity

While being well known and used in our technology industries for many years, AI technologies - and machine learning in particular - have benefited from recent advances in three areas: increase of computing power, availability of relevant data through powerful broadband interconnection, and cloud storage and new algorithms. This now allows companies to move from the orientation phase to the deployment of new business models based on AI[2] and to develop new AI applications in many areas such as healthcare, agriculture, energy, factory automation, smart cities and transport solutions, fostering both their development (notably in terms of productivity) and their possible contribution (via new processes) to the achievement of many of the United Nations' Sustainable Development Goals. With the potential of AI to add around €13 trillion by 2030, of which over €2 trillion in Europe[3], the impact of this technology is enormous.

The European strengths

It can be expected that in the long-term the biggest potential economic uplift from AI is its uptake in industry, which will bring benefits far beyond improved productivity. AI solutions that will optimise the manufacturing process of Europe's industrial sectors will massively boost their productivity gains. With the increased uptake of industrial AI, these productivity gains will be. highest for the manufacturing sectors. Furthermore, consumers will indirectly benefit from this, as they will gain access to more flexible, responsible and custom-made sustainable manufacturing goods, with fewer delays, fewer defects and faster delivery.

Europe is specifically able to take the efficiency of its industrial infrastructure to the next level with the uptake of AI innovation and solutions in industry. Europe's extensive know-how and expertise in industry, combined with AI technology, will not only keep Europe's industry competitive, but further propel it towards global leadership on industrial AI. In this respect, industrial AI is not only about efficiency gains, but also about cross-sectoral integration **- but this requires an urgent set of measures to accompany this transformation.**

What is Industrial AI?

It is important, for the clarity of the debate, to arrive at a proper definition of what AI is in the industrial area. Currently there is not one definition, but Orgalim would like to highlight the one proposed in its set of comments of 8 February 2019 on the upcoming Impact Assessment of the Machinery Directive[4]:

> **AI refers to computer systems based on algorithms designed by humans that, given a complex task, operate by processing the structured or unstructured data collected in their environment according to a set of instructions, determining the best step(s) to take to perform the given task, via software or hardware actuators. AI computer systems can also adapt their actions by analysing how the environment is affected by their previous actions.**

This definition is similar to the definition given by the EU Commission's High-Level Experts Group on AI[5], as it insists on the human origin of any AI and highlights the fact that **a machine can only perform an action**

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assigned from the outset by a human - whether a designer, computer specialist or manufacturer. This "narrow AI" has been deployed effectively and safely in manufacturing for several decades.

Integrating AI solutions (software and hardware) with a highly skilled labour force in industry has massive potential for Europe and its strong industrial base. A core objective of the EU should be to boost uptake of AI in industry to meet the objective of creating an AI ecosystem that enables European companies to put world-leading and responsible AI solutions on the market at home and beyond.

AI in industry is an engine of progress and a source of good that can benefit society by helping us tackle some of our biggest challenges; from climate change, through an ageing society, to scarce resources. Orgalim is convinced that showcasing the benefits of AI in industry will help shape the policy debate in a more positive light.

It is also important to note that the development of Industrial AI differs significantly from Consumer AI. In the industrial sector, we work actively with physical models, combined with data-driven methods, compared to the scale of data sets in the consumer space. In the industrial AI space, there is also a stronger need for co-creation in R&D, because the data is usually stored with the customer.

Call to action

Therefore, **it is important that AI remains a top priority for the new legislative cycle and Orgalim welcomes the continued focus on AI in the priorities of the EU institutions.**

Orgalim calls for an approach towards Trustworthy AI, addressing both the **ethical and industrial dimensions, both enshrined in a human-centric approach.** We believe that by bringing these three core elements together, we will reap the full benefits from AI innovation in Europe and create a competitive differentiator for its industries in the global AI race.

This will require the putting in place of the right framework conditions. As previously mentioned, the B2B environment is different from the B2C one and will therefore require different policy solutions, even though in certain instances a clear-cut distinction between sectors may no longer be relevant. We believe that, when it comes to the industrial sector, any approach must take the risk linked to the application into account (depending on the level of interaction between machines and humans) and distinguish between purely technical applications of AI and AI that have an impact on humans. Policies could be tailored according to value chains, where differentiation can be more easily illustrated.

In the next chapter, Orgalim outlines a policy approach which strongly emphasise the need for a coordinated approach between industry and the public authorities at local, national and EU levels.

systems are software (and possibly also hardware) systems designed by humans (1) that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions. (1) Human design AI systems directly, but they may also use AI techniques to optimise their design".

Some case studies

Circular economy[6]

Waste

- Waste is monitored by cameras and sensors. An AI software analyses the sensor data, creating an accurate real-time analysis of the waste stream. Based on this analysis, the heavy-duty robots make autonomous decisions on which objects to pick, separating the waste fractions quickly with high precision.

- A company develops systems for intelligent sorting and classification of e-waste, which enables companies to extract the full value from (mixed) e-waste streams in two ways. First, it helps reduce e-waste by improving overall recycling and refurbishing rates. Secondly, it increases valorisation by identifying whether a product's condition is more suitable for refurbishment or recycling. The sorting systems are equipped with sensors and cameras. Through visual recognition and supervised machine learning enabled technology, the sorting systems can classify the type, and, if perceptible, the condition, of e-waste at a granular level. Currently, the system requires manually labelled images to train the AI algorithms.

Energy Technology

Affordable and clean energy for all

- **Optimise energy infrastructure** such as energy distribution systems by helping maintain a smooth flow of power with the increasing use of distributed power generation from renewable resources or gas/wind turbines to generate more power whilst reducing pollution.
- **Integrating machine learning in sensors**, thus increasing the intelligence of sensor solutions in buildings significantly increases energy savings of buildings.
- **Application to wind turbines**. Data analysis and predictive maintenance are already helping to avoid downtimes and lower the costs of wind parks. In the future, AI solutions could configure entire wind farms for maximum yield by taking complicated aerodynamic effects into account. Learning algorithms have the potential to make renewable power even more efficient and cost competitive.

Vibrant, liveable communities with net-zero carbon emissions

Small- and large-scale power plants that use renewable sources of energy, a range of storage solutions (from power-to-X facilities to batteries in private homes), electric vehicles, smart buildings, and many similar approaches can help achieve this goal. Yet running, stabilising, and optimising these intricate systems is nearly impossible for the human mind. AI can intervene and help us find the right answers to these complicated questions – and run infrastructure more smoothly and efficiently than ever before.

[6] Ellen MacArthur Foundation, AI as a tool to accelerate the transition (2019)

Automation and Factory

Revolutionising global logistics and supply chains

To reduce the costs of shipping and make the shipping process itself more efficient and sustainable, artificial intelligence can be used to analyse the existing routing and perform track route optimisation.

Productivity gains, reduced costs and high-quality products

- **Predictive maintenance** solutions to redefine maintenance processes and improve operational efficiency in transport, for instance high-speed trains.
- **AI-enabled industrial robots** in manufacturing to speed up repetitive tasks by visualising and adapting changing environmental conditions, broadening tasks and preventing costly mistakes on the assembly line.
- Today, we are capable of designing, simulating and testing products and even entire production lines with specialised software. AI solutions can also already enhance specific production steps: They can ride "piggy-back" on existing industrial controllers and boost their capabilities. In the future, **AI will help entire factories self-organise** - for instance, to reconfigure manufacturing processes, to shift from one product to another, find solutions to unforeseen events, resolve interruptions or reduce the consumption of energy and other resources. All this will greatly improve the efficiency and speed of our factories and can contribute to improving environmental performance.
- Companies copy a real-life process **in a digital twin**: the twin is the virtual copy of a real machine/system/factory, which helps to simulate all aspects of the plant and its installations in order to optimise it. The two twins – the physical plant and the digital copy – are permanently connected and can develop a common memory. The simulations open up entirely new dimensions for optimising processes or resource use from a life cycle perspective, from product design, production planning, engineering to commissioning, operation, servicing and the modernisation of systems and plants. Manufacturers can also develop new services from this and find new business models for and with their clients (co-value is created and shared). Digital twins may also be used with industrial trucks to represent a copy of the Its, including components, hardware, software and parameters, based on data representation of a digital twin.

Transport

Enabling safe and secure autonomous driving

For example, machine learning is required for autonomous driving (AD), at the very least in image recognition, where human programming cannot possibly keep up. Human-level image recognition typically requires systems with tens of millions of parameters that are trained on a supercomputer for two to four weeks—a task that would take 1,000 to 3,000 years if done manually by a person. Image recognition has an important application in enabling autonomous driving in the factory, making transport safer.

All these examples show that industrial AI can be used as an engine for progress. It also demonstrates the role which AI can play, both in boosting European industries' competitiveness, contributing to solving societal challenges, and addressing the United Nations Sustainable Development Goals (SDGs). We firmly believe that this dimension is also part of an ethical and human-centric approach.

Orgalim aisbl
BluePoint Brussels
Boulevard A Reyers 80
B1030 | Brussels | Belgium

+32 2 206 68 83
secretariat@orgalim.eu
www.orgalim.eu
VAT BE 0414 341 438

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A POLICY AGENDA ON AI

A regulatory framework based on the Single Market principles

As stated in our initial position paper on Artificial Intelligence in early April 2018, industry requires **legal and regulatory certainty with a foreseeable horizon** to be able to invest, innovate and deploy new AI-based products and services. In our view, this also means that a European regulatory framework must be based on the Single Market principles and avoid barriers to trade between the EU Member States. In case of product-related AI applications this could be ensured by using the New Legislative Framework (NLF). This is fully supported by the High-Level Experts Group on AI in the introduction to chapter 30 of its Policy and Investment Recommendations.

Taking the application into account: a two step approach

Orgalim stands for an enabling and innovation-friendly AI framework in Europe with our democratic values built-in. We acknowledge that AI applications might bring new challenges , including in the industrial sectors represented by Orgalim. Nonetheless, it is an important exercise for policymakers to differentiate the varying degrees of risks linked to AI technologies in their different applications. General scrutinising of AI-technologies which hampers innovation and creates uncertainty must be avoided. Clear criteria must be established for identifying critical areas. When something has been identified as a risky application (which will be a minority of industrial AI applications) a pyramid-like approach to risk-management could be an important one. Taking this into account, it can for instance be concluded that most industrial AI application use cases have entirely different ethical implications from consumer-oriented AI solutions for end-consumers. Industrial AI applications should, to the extent possible, take into account the EU's "Trustworthy AI" principles.

European coordination

Furthermore, a regulatory framework for AI should be coordinated at the EU level with contributions and active participation from the Member States. Orgalim welcomes and supports the fact that the European Commission has already initiated this by calling for a "Coordinated Plan on AI". Our industries highlight the importance of a European approach and applaud the concerted approach by Member States to prepare and deploy their national AI strategies based on the Commission's plan. We believe the upcoming AI strategy could be a good moment to take stock and propose potentially new steps to strengthen coordination.

Joining resources and efforts at EU level, and building on a risk-management approach while also adhering to single market principles, is the right approach to shaping a policy agenda on AI that will enable its industry to provide world-leading responsible AI solutions for the benefit of society.

Building on these key parts of a European approach, we believe such an approach should additionally focus on the following four core areas:

- A strong Internal Market framework: tackling core components is needed for a successful AI deployment. A complementary tool to enable innovation for AI solutions could be supported by a European framework for regulatory sandboxes.
- Accompanying measures: investments in R&D and capital, innovation, skills.
- Fostering acceptance for AI solutions with ethics, security and privacy being core elements.
- A strong global outlook.

I. A strong Internal Market and legal framework

1. Safety & liability legislation supporting AI

Our recommendation: Orgalim believes safety and liability legislation is currently fit for purpose, including when it comes to AI development.

The free circulation of goods is the cornerstone of Orgalim technology industries' support to the EU. Since the preparation of the Low Voltage Directive in the early 1970s, we have largely contributed to the drafting, the implementation and the application of the "New approach to technical harmonisation and standards", now the "New Legislative Framework" (NLF) - based on legislation defining essential requirements and leaving it up to manufacturers (essentially via standardisation and where needed certification), to ensure compliance with these requirements.

The High-Level Experts Group on AI recommends[7] *the adoption of a precautionary principle-based approach for specific AI applications that generate unacceptable risks.* The precautionary principle is for use by the EU Regulator to strike a balance between the benefits for society of technological progress while mitigating possible drawbacks in the face of scientific uncertainty, according to criteria provided in the Commission Communication 2000/0001[8]. Since then, the essential requirements included in NLF legislation have been defined accordingly to provide and ensure a high level of protection to end-users, based on a risk analysis carried out by manufacturers, under the scrutiny of national market surveillance authorities[9]. It can therefore be argued that the NLF based legislation in itself has all the necessary precautionary measures. Continuing to apply the NLF to the EU legislation on machinery safety is therefore the most appropriate way to apply the HLEG on AI's recommendation.

With regard to the Machinery Directive in particular, a review process was launched in June 2019[10] with a focus on the impact of digital technologies on its functioning. Orgalim firmly believes that the current requirements do not present any legal gap. Indeed, if manufacturers wish to place a machine embedding AI functions on the market, they are under an obligation to carry out a risk assessment, followed by conformity assessment procedure(s), considering the risks associated with AI agents. Through this process, the manufacturer determines the limits of the machinery and its intended use (which also includes any AI functions). It is within this framework that all AI applications (industrial or otherwise) operate today - and will continue to do so in the future. Buzzwords such as "general AI" or "super AI" should not be used in relation to equipment covered under the scope of the MD. In its comments of February 2019 "On the upcoming Impact Assessment of the Machinery Directive"[11], Orgalim further detailed how machines embedding AI are covered by the requirements of the Annex of the Directive.

As regards the Product Liability Directive of 1985, Orgalim has assessed that, thanks to its technology-neutral provisions, its provisions remain valid even in the digitalised domain, and its scope should therefore not be extended to services or stand-alone software, the concepts of "joint liability" not be introduced, of "defect" remain interpreted on a case-by-case basis by the Courts and of "damage" limited to material damage. More generally on liability, Orgalim fully supports paragraph 29.7 of the High-Level Experts Group on AI's Policy and Investment Recommendations urging "policy-makers to refrain from establishing legal personality for AI systems or robots".

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[7] Paragraphs 26.1 and 26.2 of the Policy and Investment Recommendations, High Level Expert Group on AI.
[8] See Commission Communication on the precautionary principle
[9] See The "Blue Guide" on the implementation of EU product rules 2016 – p 39
[10] See https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2018-6426989/public-consultation_en
[11] See https://www.orgalim.eu/position-papers/orgalim-comments-upcoming-impact-assessment-machinery-directive

An analysis of the robustness of other pieces of EU legislation against AI safety risks (for example as regards the RED) should be undertaken before proceeding with any revision.

2. Regulatory sandboxes

Our recommendation: a framework for the definition and governance of regulatory sandboxes must be developed by EU and relevant stakeholders to offer a harmonised approach by Member States.

In paragraph 29.2 of its Policy and Investment Recommendations, the High-Level Experts Group on AI proposes "*the creation of regulatory sandboxes to help stimulating innovation without creating unacceptable risks*". Orgalim fully supports this key policy ask. A framework for AI needs to include this aspect, which would allow for controlled regulatory experimentation. This should facilitate the introduction of new cutting-edge and responsible AI solutions, while allowing close monitoring and assistance during a trial period. Orgalim calls for an EU framework, including a clear definition, for regulatory sandboxes where certain exceptions could be given to Member States. However, at the same time we call for a cautious approach to avoid a race to the bottom where Member States and regions could provide advantageous exceptions, creating an imbalance in the Internal Market.

3. Data: unlocking the power of industrial data with AI in Europe

Our recommendation: Orgalim considers that, given the complexity of business cases in various value chains, the contract rather than the law should be the basis for data exchange and flow of data overall in Business-to-Business (B2B) relationships.

With the adoption of the Regulation on the free flow of non-personal data in 2018[12] (its third data package with a focus on how to exploit better industry-held data) the EU clearly recognised the need to establish a differentiation between the B2B and the B2C sectors of industry as regards the EU data regulatory framework. As previously stated, Orgalim fully supports that recognition.

AI and data are inextricably linked and cannot be discussed separately. The overall question on access to/availability of data to make the most of the opportunities stemming from industrial AI solutions is one that must be assessed carefully by policymakers together with industry.

Bearing in mind the link with the discussion on Intellectual Property with regard to data, Orgalim continues to believe that data sharing mechanisms in the B2B area need to have a contractual basis

In its 2017 position paper on Industrial Data[13] and its recent paper "Towards a Common European Data Space for smart manufacturing", Orgalim outlines the specificities of industrial data. Its heterogenous nature means that different data types, categories and levels of added value exist. Data may also either be a side-product or created as part of a production network, containing trade secrets. Importantly, the analysis of industrial data creates added value. Data-driven business models and services will emerge, but the data-enabled value creation and monetisation will often be embedded in services or product-services combinations. Moreover, high-quality data sets play a much more important role in industrial value chains compared to business models based purely on Big Data. The implications for data in industry, particularly given that Orgalim's industry largely operates in a B2B context, are such that there is not a "one size fits all" solution.

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[12] Regulation 2018/1807 on a framework for the free flow of non-personal data in the European Union https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R1807

[13] See Orgalim comments on the European Commission initiative on "Building the EU Data Economy": https://www.orgalim.eu/position-papers/orgalime-comments-european-commission-initiative-building-eu-data-economy

II. Accompanying measures

4. Investment: Boosting public and private investment

Our recommendation: Member States should adopt the EU Multiannual Financial Framework to allow for the full deployment of the next series of EU programmes (Horizon Europe, Digital Europe and the Structural Funds), as well as the new InvestEU Fund, which could leverage the cooperation between manufacturers and the financial sector to massively invest in innovative projects.

Considering the gap in terms of AI investments with China, and the US[14], the European Commission proposed in its "Coordinated Plan on AI" of December 2018 that €20 billion should be invested during the period 2018/20 with the ambition of gradually reaching €20 billion per year. These efforts are expected to come from the public (EU and national) and private sectors.

The Commission has already led the way by increasing by 70% the part of Horizon 2020 dedicated to AI for the years 2018-2020, to a total of €1.5 billion. For the next EU financial period 2021-2027, under the new Multiannual Financial Framework (MFF), it has proposed the allocation of €1 billion from "Horizon Europe", the next EU R&D Framework Programme, and from a new "Digital Europe Programme". More money will also be available from the Structural Funds. Finally, the new InvestEU Fund, successor to the Juncker Plan and guaranteed by the EU budget to the level of €38 billion, is expected to leverage up to €650 billion to be invested in sustainable infrastructure, research, innovation and digitisation, small and medium-sized businesses and social investment and skills - all areas of direct relevance to AI.

Putting in place these ambitious tools **requires**:
- the Member States to swiftly adopt the MFF, and to raise their public investments in AI to the same level as the EU budget, in line with the Coordinated Plan.
- local authorities across Europe to take full advantage of the Structural Funds to deploy AI as part of their "smart specialisation strategies."[15]
- the private sector, and particularly manufacturers and the financial sector, to fully cooperate to massively invest in innovative projects, which may require further efforts in terms of awareness and education.

To facilitate the **deployment of AI, i**nvestments should particularly go to:
- **Infrastructures,** especially the deployment of the next generation of telecom infrastructures 5G and of high-performance computing to facilitate the upswing of data circulation in a secure manner, both in the research (fundamental and applied) and manufacturing areas,
- **Cybersecurity,** which is becoming even more crucial for the development of the (Industrial) Internet of Things (IIoT); priority should be given to the implementation of the EU Cybersecurity Act adopted in April 2019[16], the adoption of a network code for the energy sector, to AI-enabled cyber protection systems and to the protection, beyond public infrastructures, of the entire data transmission system (software and hardware),
- **The public sector**, which could not only lead by example to digitally transform itself but also make a strategic use of public procurement to create new markets on AI applications (B2G) and act as a catalyst, which also requires more open access to public data,
- **Research and Innovation** (see below)
- **Education,** from primary to lifelong-learning (see below).

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14 [COM (2018) 795 final](#) p.3
15 See the example of five regions given in the Commission's Coordinated Plan, [COM (2018) 795 final](#) p.3 footnote 12
16 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0881&from=EN

5. Supporting R&D & Innovation

Our recommendation: the B2B sectors require that European and national public research should be focused on industrial applications.

The "Policy and Investment Recommendations for Trustworthy AI" of the High-Level Expert Group on AI provide a substantial set of proposals on R&D and Innovation, including:

- A **European Strategic Research Roadmap for AI**, focusing on areas of strategic values and opportunities, involving major open disciplinary and interdisciplinary scientific questions, and deployed in both fundamental and purpose-driven research;
- A **simplified network of research funding instruments**, that would include Centres of Excellence, the creation of a Public Private Partnership on AI, and an EU-wide network of AI business incubators that connects academia and industry, thus facilitating the transition of AI solutions from research labs to testing environments and commercial markets[17].

Areas of research should include:

- Ability to explain (also for liability reasons) and to repeat
- Useful adaptation of algorithms to specific problems in industrial applications, based on cooperation between data/AI and engineering experts
- Embodiment of AI into cyber-physical-systems and robotics
- AI algorithms for chips to be deployed in the IoT
- Hybrid AI (integration of reasoning and learning)
- AI for cybersecurity

It is of crucial importance for the B2B sectors to focus research on applications and relevant solutions for companies to achieve success in the global race. This could be supported by stimulating beneficial innovation funding EU hackathons, competitions and industry challenge-driven research missions in AI across various sectors.

Orgalim expects that the priorities set up for the first two years of the Digital Europe Programme will contribute to the development of R&D in these areas. In addition, fundamental research remains essential for the long-term development of AI.

6. Facilitating industry's adoption and deployment of AI - SMEs in particular

Our recommendation: ensure the deployment of AI throughout the entire European industry.

In order to accelerate the digitalisation of Europe's entire industry, and the deployment of AI as one of its most important tools, a major effort must be undertaken towards less digitally mature companies, particularly SMEs, in terms of awareness raising and support for development, deployment and training/talent acquisition. This should be tailored to the value chains in which SMEs operate.

As a basis, it is essential to ensure efficient technology transfer and low threshold access to technologies, projects, results and networks, using for example the Digital Innovation Hubs (DIHs) promoted by the European Commission. Project selection for funding should also be agile and unbureaucratic.

Often, SMEs do not have the technical capability to make proper use of their own data - an issue which could be overcome by the provision of digital platforms allowing them to organise and improve the quality of their

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17 A European Vision for AI, calling for the establishment of a "Confederation of Laboratories for Artificial Intelligence Research in Europe - CLAIRE" as a decentralised CERN, was presented in 2019

data or developing data strategies (data competence centres), or to use others' data via contractual arrangements, which could be facilitated by official structures or an ecosystem facilitating and match-making partnerships.

7. Skills

Our recommendation: the EU should launch a "master plan for training and education", to upgrade the general education level in Science, Technology, Engineering and Maths (STEM) and to develop curricula integrating digital and physical engineering.

It is also crucial to address the skills issue: not every company has the possibility to employ data and AI experts, of whom there is also a shortage. Apart from building specific training schemes to retrain the existing workforce and training new talents, possible solutions could be found using autonomous analytics and guided analytics, which can help domain experts in companies to overcome the shortage of data scientists, or with secondment programmes for AI engineers in SMEs.

Moreover, there is a need for a "master plan for training and education"[18], which should include a coordinated and bench-marked approach between the Member States to upgrade the general education level in Science, Technology, Engineering and Maths (STEM) for all school pupils. This should include a basic understanding of the digital world (and AI in particular), to attract more young people (particularly women) to renewed technical and engineering studies, with a focus on those that combine the digital and the physical areas , to provide grants to PhD and post-PhD students in all AI-related domains, including social sciences (cognitive, socio-cultural and entrepreneurial competencies), and to design tools to keep them in Europe.

III. Fostering public trust in AI solutions

More than other technologies, AI has generated fears from the general public, with images related to a lack of control of machines/robots, or a take-over of decision-making by algorithms, both capable of reprogramming themselves.

In order to ensure its acceptance by EU citizens, there is a need to explain and educate. Furthermore, for certain applications of AI there is a need to develop suitable approaches for transparency as well as accountability of AI-development and use, so as to improve trust by EU citizens. Limits to this approach include the need to protect Intellectual Property Rights and the difficulties of explaining complex matters to the public at large.

8. Implementing the EU Ethics Guidelines

Our recommendation: the Ethical Guidelines of the HLEG on AI should serve as the framework, remain voluntary and be simplified and adapted in close cooperation with the relevant industry sectors. This would then be used by the EU and the Member States to promote an international approach towards ethical AI.

The first deliverable of the EU High Level Expert Group on AI consists of a set of "Ethics Guidelines for Trustworthy AI"[19]. These Guidelines contain two assessment tools to help AI developers and deployers of AI systems test their compliance with the Ethical and Robustness requirements for Trustworthy AI.

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[18] VDMA « Artificial Intelligence in Mechanical Engineering - Perspectives and Recommendations for Action", December 2018
[19] "Ethics Guidelines for Trustworthy AI", EU High Level Expert Group on AI, April 2019

Orgalim aisbl
BluePoint Brussels
Boulevard A Reyers 80
B1030 | Brussels | Belgium

+32 2 206 68 83
secretariat@orgalim.eu
www.orgalim.eu
VAT BE 0414 341 438

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Orgalim welcomes this approach and the "piloting phase" that stakeholders can use to test their AI projects against the Ethical and Robustness requirements for Trustworthy AI and calls for a proper implementation of this voluntary instrument before any legislation is envisaged. However, both tools require major simplifications: the governance structure is much too sophisticated for most of SMEs in our sector and the assessment list excessively addresses issues concerning the interface between technology and humans. We believe that a sectoral approach towards ethics has to be developed based on "the context-specificity of AI systems", as admitted in the Guidelines themselves[20]. Indeed, while conceptually necessary, not least to correct misunderstandings about the exact nature and functions of AI, discussions about ethics are not equally relevant for every application scenario in every sector of industry or services. Machine-to-machine exchange of data on the inspection of a surface does not require the definition and application of the same "red lines" as any personal data-related AI application. Therefore, any generic assessment can only be a framework which needs flexibility, so that it can be adapted.

A regulatory approach to AI in Europe that takes into account the EU Ethics Guidelines must be compatible with the risk-based approach as described above. The ethical implications are entirely different for low-risk AI applications, e.g. in industry than for AI applications using personal data or in direct interaction with the public. These differences must be reflected in the policy approaches at EU level to avoid overburdening those industrial sectors that can carve out global leadership on AI, provided they can be enabled by an innovation-friendly European AI framework.

Moreover, these EU Ethics Guidelines should be used at international level. In May 2019, the OECD endorsed the Principles on AI, the first international agreement of its kind. They offer a very important level-playing field as they focus on "fostering innovation and trust in AI by promoting the responsible stewardship of trustworthy AI, while ensuring respect for human rights and democratic values". Even more importantly, these Recommendations inspired the set of Principles adopted by the G20 Trade and Digital Economy Ministers at their June 2019 meeting in Japan. In this context an AI global governance approach that builds value for Europe's economy and society by protecting EU ethics values should be promoted by all players around the globe. Promoting the EU Ethics Guidelines in further activities of these organisations would be very useful to enhance European industry's competitiveness.

9. **Privacy**

Our recommendation: the proper implementation of the GDPR requires a general guidance by the Commission to avoid a fragmented application by the Member States Data Protection Authorities.

In those cases where personal data is being processed, the GDPR is applicable. Even though personal data in the context of industrial AI is limited, when it does apply there are certain provisions that might raise questions.

It is recommended to have guidance at EU-level to avoid fragmentation by guidelines or recommendations of national Data Protection Authorities regarding AI. By way of example, this fragmentation may already be the case where DPAs have the power to impose a list of processing activities requiring a data protection impact assessment.

Specific, clear, and practical guidance from the European Data Protection Board regarding GDPR compliance and AI in order to obtain GDPR-compliant applications seems useful. Hereafter are some examples:

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[20] "Ethics Guidelines for Trustworthy AI", EU High Level Expert Group on AI, April 2019, p.24

- GDPR requires clear and transparent communication regarding the data processing activities. However, explaining what AI is in an intelligible way to data subjects is challenging. How to inform people about the way of profiling, automated decision making, etc. following on from the use of AI;
- How to practically conduct a data protection impact assessment;
- How to practically implement data subjects' rights.

It could be useful to think of EU standards which are attainable for different types of organisations and value chains.

Additional AI legislation regarding personal data protection should be avoided in order to prevent the risk that the applicable legislative framework on data protection becomes more complex and puts a burden on competitiveness .

10. Cybersecurity enabling AI deployment.

Our recommendation: a holistic approach to cybersecurity policy should be the goal.

Cybersecurity is an important key element for both industry and citizens, as expectations are high for reliance on a robust level of cybersecure (by-design) products, solutions and processes. This is of course also true for AI solutions. To that end, Orgalim calls on policymakers to consider a set of seven principles aimed at creating a holistic approach to cybersecurity policy,[21] shaping an enabling, consistent and coherent cybersecurity framework for the EU:

- Consistent and coherent legal requirements
- A European approach to cybersecurity
- Common cybersecurity goals to ensure horizontal consistency
- A risk-based approach further to the products' intended use
- Transparency and internationally recognised standards are key
- Build policies on existing industry security measures
- Competitiveness depends on the level playing field and market surveillance

With such principles in place, Orgalim strongly believes that Europe could become the global reference point on cybersecurity, as it has become for personal data protection with the GDPR. Given that one of Europe's strengths in cybersecurity is in the development of industrial security and embedded security, our industries can ensure that any industrial AI solution has an adequate level of cybersecurity, contributing to the EU's overall core objective of increasing Europe's cybersecurity capacities.

AI will of course also be a tool that may contribute to more cybersecurity in industry. However, the synergies between AI and cybersecurity are still at an early stage. Orgalim calls on the policymakers to further explore the possibilities of AI to boost cybersecurity and to engage in a dialogue with all relevant stakeholders.

11. AWARENESS

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21 Orgalim position paper; Building a real European Single Market for Cybersecurity - A call for a consistent approach – guiding principles, https://www.orgalim.eu/position-papers/digitaltransformation-building-real-european-single-market-cybersecurity-call-consistent

Our recommendation: continue to foster dialogue between the social partners and to inform and organise a dialogue with the public at large.

As pointed out in our initial position paper of April 2018, Orgalim considers that a proper deployment of AI in Europe requires massive investments by all societal stakeholders, in at least two areas:

- **Training and Social Dialogue**

In paragraph 3.3 of its Policy and Investment Recommendations, the High-Level Experts Group on AI proposes the application of a process of representation, consultation and, where possible, co-creation with the involvement of workers. This is fully in line with Orgalim's **recommendations for a better dialogue around social issues**[22]. This dialogue should evolve around training and re-skilling for the existing workforce, to the extent foreseen by EU and national social frameworks, which is an absolute priority to ensure the massive deployment of AI in all industry sectors, but also to overcome fears and risks of de-classification of some professions on functions, even white-collar roles. It should also help to provide more clarity about the positive and negative aspects of the deployment of AI throughout industry and the entire economy.

- **General Public**

Finally, there is also a fundamental need to inform and organise a dialogue with the public at large. Europe does not have to focus its AI strategy on organising a massive supervision and control of individuals, either by the authorities or by large companies. But its approach towards AI, more focused on the enhancement of its "traditional" industries, has to be accepted and therefore co-designed by society. Provision of factual information to the public, training of journalists and educators or citizens[23], establishment of a yearly European AI Awareness Day as proposed by the High-Level Experts Group on AI (paragraph 1.6 of its Policy and Investment Recommendations), and organisation of company open days for pupils, students and the general public are areas to further explore, as well as constructive confrontations with "whistle blowers". For example, by promoting free AI training available to the public to update citizens' basic knowledge .

IV. Global coordination

12. Ethics

Our recommendation: an international approach towards ethical AI should be promoted by the EU and the Member States.

As mentioned above, in May 2019, the OECD endorsed the Principles on AI, the first international agreement of its kind, which inspired the set of Principles adopted by the G20 Trade and Digital Economy Ministers at their June 2019 meeting in Japan. It is essential for the EU that an AI global governance approach - that builds value for Europe's economy and society by protecting EU ethics values - should be promoted by all players around the globe. Orgalim will look for opportunities to support a global dialogue on Trustworthy AI.

13. Standardisation

[22] Orgalim position paper of 4 April 2018 on "Artificial Intelligence: a pillar of Europe's future competitiveness"
[23] See for example a Dutch course on AI: https://www.linkedin.com/pulse/you-cant-have-national-ai-strategy-without-addressing-jim-stolze/

Our recommendation: need to continue the development of international standards.

In the international context, standardisation plays a central role both in the implementation of the NLF and more generally for the competitiveness of Europe's technology industries. In the domain of AI in particular, Orgalim promotes working at international level as much as possible (and to transpose as much as required these standards into harmonised standards for the purpose of NLF legislation). In context, Orgalim welcomes the work carried out in the framework of IEEE on a "Global Initiative on Ethics of Autonomous and Intelligent systems"[24], which illustrates further the particular attention paid by the technology stakeholders' community to ethical issues.

European Industrial AI will increasingly be exported to third countries. In order to facilitate these exports, Orgalim underlines the need to draft and use internationally recognised and consensually created technical standards of the International Organisation for Standardisation (ISO), the International Electrotechnical Commission (IEC) and the International Telecommunication Union (ITU) to harmonise the technical requirements of AI.

In the area of transparency and explainability of AI decisions, international standards such as ISO 13849 and IEC 61508 should be further developed.

CONCLUSION

The new European Commission, under the leadership of President von der Leyen, has put forward the digitilisation of industry as a high priority. The European Technology industries represented by Orgalim can and will play an instrumental role in their deployment, particularly through the major opportunities offered by digitalisation, and AI applications in particular.

Indeed, AI offers immense opportunities to European industries to further grow at global level, and to contribute to the UN Sustainable Development Goals, provided that the right choices are made, particularly at EU level, to support its development and deployment. Industrial AI is part of the European approach towards Trustworthy AI, and our sectors, depending on the value chains in which they operate, require an ambitious and forward-looking approach. We look forward to working with all stakeholders to ensure that we can set the right course for Europe's Technology Industries to further strengthen our global leadership.

[24] See https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/ead1e-introduction.pdf