



## EC THIRD DATA PACKAGE & ARTIFICIAL INTELLIGENCE COMMUNICATION

“SHAPING A FUTURE THAT BENEFITS SOCIETY: AI AND DATA IN EUROPEAN TECHNOLOGY INDUSTRIES”

*18h30 - 20h00 European Parliament Roundtable ASP 1H01  
20h00 - 22h00 Dinner Debate – Members’ Salon  
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European Parliament





Henna VIRKKUNEN MEP, (EPP Finland) Industry, Research & Energy Committee (ITRE), Rapporteur on Online Platforms & the Digital Single Market

#### Digital Innovations

New innovations and ideas are the key for success of Europe. Europe needs to be the place where digital innovations can be created and they can flourish.

The European Union and the Member States will face many reforms as the new technology is changing both the economy and the concept of work all over the world. Digitalisation is the biggest driver of change: mobile technology, cloud services, data, internet of things, sharing economy, robotisation, 3D printing.

Only two other non-digital megatrends have been added to the list of nine major change makers at the World Economic Forum: new energy and technology, creates new demand and generates entirely new products.

It is good to note that in Germany the degree of industrial robotisation is the highest in Europe, and the country's unemployment rate is among the lowest. A similar example from my country Finland is found in Uusikaupunki, whose automotive industry, thanks to robotisation, has become very competitive and is constantly recruiting.

Khahil ROUHANA , EUROPEAN COMMISSION, Deputy Director General DG CNECT, Directorate General for Communications Networks, Content & Technology,

#### ARTIFICIAL INTELLIGENCE FOR EUROPE

##### AI Opportunities & Challenges

- AI to increase global GDP by ~ €13 trillion in next decade
  - Affects all aspects of economy and society
  - Transforms the way we work and learn
  - Helps us address key societal challenges
- Strategic importance to our safety and security
- Key part of global race for competitiveness and growth



##### EU strengths and challenges

- World - leading position in robotics, especially for professional users
- Strong industrial and services sectors: transport, healthcare, manufacturing
- Strength in the business-to-business domain, with excellent research centres
- Europe is behind in investments in AI. A common strategy to attract investment and address fragmentation is needed



Investment in EU AI: low and fragmented

- North America: high estimate = \$23billion; low ~ \$15billion
- Europe: high estimate ~ \$4billion; low estimate ~ \$3billion
- Asia: high estimate ~ \$12billion; low = \$8billion

Artificial Intelligence for Europe

Commission Communication published 25 April 2018

Bringing benefits of AI to every business citizen – under 3 pillars:

- Boost technological & industrial capacity-AI uptake
- Prepare for socio-economic changes
- Ensure an appropriate ethical and legal framework

Accelerate development and widen use across the economy

Boosting the EU's technological and industrial capacity: 2018-2020 in 5 areas

- €1.5 billion EC investments into AI in 2018-2020
- Basic and industrial research (health, transport, agriculture, manufacturing, etc)
- AI-on-demand platform
- Network of AI-focused Digital Innovation Hubs (DIHs)
- Strengthening AI excellence centres

MFF PROPOSAL: AI IN DIGITAL PROGRAMME

Investing in the future: DIGITAL EUROPE Programme

- Digital transformation & Interoperability €1.3 billion
- High performance computing €2.7 billion
- Artificial intelligence €2.5 billion
- Cybersecurity & trust €2 billion
- Advanced digital skills €0.7 billion

Total = €9.2 billion

AI is helping to solve some of the world's biggest challenges: from treating chronic diseases or reducing fatality rates in traffic accidents to fighting climate change or anticipating cybersecurity threats.



Europe's private investments in AI totalled around €2.4 - 3.2 billion in 2016, compared with €6.5 - €9.7 billion in Asia and €12.1- €18.6 billion in North America.

Digital in the “digital and industry cluster” in HORIZON EUROPE (Total €15 billion)

- Key digital technologies (microelectronics, photonics software,..)
- Artificial intelligence and robotics
- Next generation internet
- Advanced computing and Big Data

Boosting the EU's technological and industrial capacity: beyond 2020

Overarching goal: Increasing the investments into AI from currently €4-5 billion per year to €20 billion per year in the 2020s under 4 headings

- An ambitious proposal to support AI in the period 2021- 27. In FP9 and digital programme
- Basic and application -oriented research
- AI excellence centres and DIHs
- Supporting the establishment of world-leading testing and experimentation sites

An ambitious initiative on data

- Revision of PSI directive
- Guidelines for sharing of private data
- Support for building common data spaces
  - o €60 million in 2018-2020 (CEF and H2020)
  - o Higher ambitions under the digital programme 2021 – 2027 (€2.5 Billion)
- Example: Health Data
  - o Aggregated, anonymised eHealth records, Genome sequenced data

Prepare for socio-economic changes

Leaving no one behind. Nurturing talent, diversity and interdisciplinarity through 4 activities:

- Dedicated training schemes. Support from ESF and digital opportunities scheme



- Anticipate changes in labour market. Foresight and expert report on AI impact
- AI a priority in the jobs and skills coalition and in the European Institute of Technology
- Strengthened support for skills including advanced skills in Digital programme in next MFF

Ensuring proper ethical and legal framework

Adapting, clarifying the legal framework when needed

Empowering individuals and consumers to make the most of AI through:

- AI Ethics guidelines by end of 2018
- Guidance on product liability directive
- A report on broader implications by mid 2019
- Working with consumer organisations and data protection supervising authorities

Working together: the European AI Alliance will provide:

- Joint reflection on the future of AI in Europe
- Full mobilisation of all stakeholders needed: industry, academia, civil society and
- Supported by a high-level expert group on AI and an online platform

Goal: Making the AI Alliance the world-wide reference platform for thinking and reflection on AI

Member States' buy-in needed:

- Member States have signed the Declaration of Cooperation on Artificial Intelligence
- They should attempt to match the European Commission investment increase of 70% to reach an EU total investment of €20 billion per year after 2020

Malte LOHAN, ORGALIME, Director General

- Dear Member of the European Parliament Ms Virkkunen, dear Members of the European Parliament, dear Deputy Director General Mr Rouhana, dear Industry Representatives.
- I would first of all like to thank you, Ms Virkkunen, for hosting us and for chairing tonight's Debate. We very





much appreciate the commitment you and your colleagues in the European Parliament have shown around Artificial Intelligence, a topic that is increasingly gaining in political importance at both the EU and at national level.

- As several Member States have already published their strategies on AI, such as Finland, France and the UK - Germany is currently working on its own strategy - and while these national efforts to tackle AI are certainly appreciated, we believe that the bigger picture requires an open and honest discussion that is best held at EU level.

Therefore, we very much welcome the Commission's strategy on AI which was published on 25 April.

With its three-pronged approach on boosting financial support and encouraging uptake by public and private sectors, preparing for socio-economic changes brought by AI and ensuring an appropriate ethical and legal framework, this approach is very much aligned with Orgalime's perspective.

- To us, the European Technology Industries, AI is already demonstrating a transformative impact on our manufacturing processes - manufacturing is currently the third largest industry for AI spending with \$2 billion.
- In particular, embedded AI applications manufactured by European engineering and technology companies are an integral part of the technology solutions required to address critical societal challenges, from climate change and the energy transition to the future of mobility, an ageing society, and security in the digital age.
- As you may know, last week the full list of members of the High Level Group on AI has been announced. This Group's objective will be to support the implementation of the European Strategy on AI. These experts will feed their input to the policymakers by making detailed recommendations on ethical, legal and societal issues.
- We welcome the opportunity to play our part and to contribute our industries' perspective, in close collaboration with the company partners from our sectors. I would like to extend my warmest congratulations to Mr Kärkkäinen from Nokia who has been selected into the Group. Congratulations also to the team of Mr Norden from Bosch. A lot of important work is ahead of us.
- Allow me to make a few comments related to the EU's AI strategy:
- The current prediction is that 83% of all AI investment will be done outside of Europe. According to the McKinsey Global Institute USA and China are leading the world in investments in AI.
- Last year, AI investment in North America ranged from \$12 billion to \$23 billion, Asia - mainly China - was \$8 billion to \$12 billion, while Europe lagged at \$3 billion to \$4 billion.
- The strong push by the European Commission to boost uptake in AI innovation through public and private investments is key and we strongly welcome that €20 billion should be invested in AI research by the end of 2020. When it comes to AI R&D Europe is in a world-leading position and we cannot afford to be overtaken.
- However, we regret that the strategy does not provide clear definitions on AI.



- What we need are clear definitions for AI. After all, we will only be able to demystify the fears around AI if we have a clear idea of what we are actually discussing.
- In our view, AI should be understood as “narrow AI”, meaning intelligence programmed by human developers and thus controlled by humans.
- Artificial intelligence is a recurrent theme in science fiction. And while we must acknowledge that the current public debate is already including concepts such as “general AI” and “super AI”, we are very far away from Skynet or Ultron.

This debate should also help fine-tuning the ethical and societal discussion on different types of AI.

- Ethics and AI is another focal point of the strategy.
- In Asimov’s ‘Robot’ series, the AI has been explicitly programmed with a set of ethical laws. Even today his work impacts thoughts on ethics of AI.
- An important task of the AI High-level Group’s work will precisely be to draft AI ethics guidelines. Its work will be complemented by a multi-stakeholder platform called the European AI Alliance which brings interested stakeholders together.
- With these AI ethics guidelines, the Commission wants to spell out how to preserve fundamental rights along with the rise of AI. The objective is to boost consumer trust in European AI applications in order to help us catch up with competitors by stimulating investments.
- However, ethics is only one piece of the puzzle.
- This brings me to tonight’s debate which links the discussion on AI with data.
- AI would be nothing without data as its algorithms feed off large amounts of data to learn. It is absolutely clear that the uptake of AI innovation in Europe can only be guaranteed by having a sound approach to data policy.
- Finding the balance between giving AI solutions all the data they need, and protecting both personal and non-personal data will become increasingly important and complex for the digitisation of Europe’s industry.
- And the time to discuss how to tackle this challenge requires us to think and act now – a proactive approach from industry is certainly needed.
- In parallel to the Commission’s strategy on AI, the Commission also published its third “data package” which emphasises the importance of making data-sharing easier and opening up more data for re-use, while taking into account personal data protection.
- With its Communication “Towards a Common European Data Space”, accompanied by a Guidance document on “Sharing Private Sector Data in the European Data Economy” there is a clear push towards incentivising companies active in the B2B context to share their industrial data with the ultimate goal to boost Europe’s data-driven economy.
- I wish to stress two points:
- First, even if society approaches AI open-mindedly and acceptance is assured through AI



ethical guidelines, it will need to be flanked by a regulatory framework on data that neither constrains nor obliges companies to disproportionately share business data.

- Second, at the same time, a framework around a European data economy will have to balance the importance of protecting both personal and non-personal data with business model innovation.
- Exploiting AI technologies in the B2B sphere, in particular manufacturing – where Europe has the potential to become a global leader – offers a unique opportunity for Europe’s industry to lead the way on AI.
- In conclusion, let me make three recommendations that, in our view, will contribute to make AI a central pillar of Europe’s future competitiveness:
  - o Clear definitions of AI should be set at EU level, which is an essential first step in designing an effective common EU policy framework based on current and foreseeable realities
  - o A prudent approach to regulation is essential to provide the legal and regulatory certainty necessary for industry to invest in, innovate and deploy new AI-related products and services
  - o Finally, Europe needs a sound data policy to boost uptake in AI innovation.
- Thanks again to Ms Virkkunen, to the representatives of the EU institutions and to the industry experts for contributing to our exchange of views. This is the kind of open dialogue that will be vital in preparing the ground for smart policy decisions.

## THE FUTURE COMPLEXITIES AROUND DATA FOR THE TECHNOLOGY INDUSTRIES

Jussi Mäkinen, TECHNOLOGY INDUSTRIES OF FINLAND,  
Chief Legal Counsel, Digitalisation-Teknoliigatollisuus

Takeup of AI in Europe: Kickstart to a New Era

Artificial Intelligence – AI – is the buzz-word of the year, although it is not mere buzz. As a concept, it is so intriguing that we are easily lost in dismay of vision of robots, ever-present superintelligence that steals our jobs and facilitates big-brother-like control wherever we go.

AI transforms the industries as well. Europe needs to move fast. Our competing nations are already running and stepping up their pace. Europe needs to move fast, as USA and China are well ahead of us. What should Europe and especially European Industries do?



What is AI – we need a common understanding

AI signifies the following: communication networks, sensors and cloud services have facilitated





the storage and processing of huge amounts of data that digitised processes create. By analysing this data, we can have better understanding how our processes and systems really work and these processes can be optimised, leading to more effective use of scarce resources, better services and product or even omitting the product-centric thinking and switching to service-driven business.

This incremental change in the industry will bring along something of a revolution in our industries and society – but it will not happen overnight. In the realm of AI, as in any other field that brings along significant changes in the society, the short-term effects are exaggerated and long-term effects are dutifully neglected.

### AI Challenges Legislation and Regulation

Europe has a firm basis, our European values of which the valuing of privacy is of great importance. The General Data Protection Regulation sets rather strict requirements for processing of personal data but risk-based approach leaves enough room for organisations to adjust their practices to take care of privacy. This balance may be easily lost, though, if application of the regulation turns out to be overtly stiff, detailed or even disproportionate.

Another important piece of legislation is the ePrivacy regulation that is under consideration by the European institutions. Europe has competitive edge on communication technologies that will play major role in Internet of things. The next generation of wireless communication networks allows direct connectivity from even tiniest of sensors to the grandest complicated systems. New kinds of networks will be implemented and these technologies are of key importance in much needed digitalisation of European manufacturing industries.

While the number of connected devices grows, cyber threats will rise in same respect. Regulation needs to allow proportionate processing of communications metadata to optimise network deployment and development. Equally, regulation should allow also the handling of metadata and the content to protect us, our factories and our infrastructure from emerging digital threats. Information security is not opposed to privacy, it is its best vehicle.

### How to Gain Momentum – Finland as a Case Study?

The Commission's communication on AI sets great emphasis on societal change and ethical considerations that the deployment of AI brings about. These issues are of utmost importance. However, these issues cannot reasonably be solved in vacuum.

In Finland, the Government is preparing a communication on completely new policy area, Information Policy. Just as environment policy was a reaction to questions raised by ecological awakening in the 1970s, information policy is set to give a holistic and analytical framework for discussion on questions related to different aspects of AI. Strong ethical current is to become a backbone of this policy, so that quickly initiated trials and applications feed real-life questions to the academia.

Government, its agencies and Finnish businesses have started an AI Accelerator, which brings together businesses, public sector and academia to facilitate scalability, development of datasets and to bring answers to the needs of the society and ethical challenges. One essential thing is sharing of good practices among businesses as major obstacles for application of AI are not technical or economical but cultural. Our Association will take the task of accelerating companies on deploy-



ment of AI and catalyse co-operation with public sector and academic research.

AI needs...

**Data.** Artificial Intelligence needs data. Lots of it, not only quantity but also quality. Public sector and publicly controlled companies can play a key role here. We warmly welcome widening of the scope of the PSI-directive to public undertakings and wider application of APIs, which make real-time information accessible for developers. Could this idea be widened to all projects that carry EU-funding?

**Knowledge.** Artificial Intelligence needs new kind of knowledge. Vast amounts of data need curious, talented minds willing to see what the data could be made do. AI is not about replacing human but assisting human and machine to work in harmony. We need new talent and to retrain the current one. STEM-education remains a major bottle-neck but we equally need a new kind readiness to learn and solve various ethical and societal issues of which some are yet unseen. We must teach to learn. We must accept the idea that perhaps majority of learning these new skills takes place outside traditional institutions.

**Trust.** Most importantly we need trust. We cannot give away to eerie dystopias. We must start small and grow big, keeping human beings in the centre of the development. Building of trust is based on knowledge, benevolence and integrity. The quick pace of change sets a big challenge, as predictability has traditionally served as a key factor of trust. European balanced privacy standards do hold a key role, combined with education and strong ethical standards as well as open, multidisciplinary discussion. Maintaining and fostering trust is a key condition to unleashing the potential of AI. It is essential to remember that trust is not a question of further regulation but one of values, understandability and sense of inclusion.

**Money.** Apart from balanced and innovation-friendly regulation, data through APIs and trust, investments are needed. Investments are adequately highlighted in the Communication, although amounts may be grander. Where Europe may have an edge is to make Europe a leader in swift, significant and sustainable application of AI to make our businesses efficient and European societies and cities more liveable.

Eva Virtute, TOYOTA MATERIAL HANDLING MANUFACTURING, Italy, Legal Counsel

During the last year, a lot of initiatives have been taken at EU level to handle and boost the new digital scenario, from the regulation on personal data protection to the new proposals and communications related to non-personal data and artificial intelligence. From a company perspective, I appreciate the efforts to harmonize legal requirements since this gives clear borders to the economic operators.

I work as legal advisor in Toyota Material Handling Europe group (TMHE), the part of Toyota Industries Corporation which covers materials handling equipment under the brands of TOYOTA, BT, RAYMOND and CESAB. TMHE is active worldwide and employs over 10,300 people across Europe, with a turnover around € 2.2 billion.





For our company, like many in our industry, data represents a big business opportunity, creating new business models, changing completely the factories (now smarter) and the way to carry out the everyday job activities. And it is well known that the skills needed in this new era are changing and must be developed to create new value. And indeed, data is helping us in creating new tailor-made solutions for our customers and new competence for the employees. Here are some practical examples.

Toyota is committed to integrated telematics. Connectivity is innovating deeply several aspects of manufacturing such as the logistic systems and provides support to eliminate waste. In this context, data use plays a key role. For instance, based on our experience derived from around 60,000 connected smart trucks already in operation, we have learnt that the average use rate of an industrial truck is just 35%. There telematics help us eliminate substantial waste of resources by improving such utilization levels. In fact, customers may improve their truck schedule by using data and the use of trucks can be more efficient and productive.

But let us speak about safety. Accidents related to the use of material handling equipment can have serious consequences, whether physical (injuries) or financial (damage to equipment and stock). The data we collected from the Toyota I\_Site system shows that by combining the monitoring of the equipment in operation with the adoption of best-practice, you can decrease the number of incidents and therefore casualties as well as repair and damage costs (estimated reduction: 70%).

To achieve these resource or safety efficiencies, we must work closely with our customers and suppliers in order to find the proper solutions, for instance to build data plans. These types of collaborations are new, involve several players and are changing as technology evolves. They require us to be agile and reactive. But this is possible as long as the freedom of contract is maintained in the regulatory framework, since it is the only way to reach a regulated business relation in an evolving and quick changing scenario, where the technological progress and the business solutions are faster than the making law process.

Another key element closely related to data is artificial intelligence. There, the potential is enormous but of course some questions remain: how much are we using data? To what extent can we use AI in the future?

For us, in Toyota, AI is a strategic tool. The possibilities open by the digital transformation may lead to the creation of new solutions and new partnerships that will empower employees and increase customer value and satisfaction. For example, we have started a partnership with Microsoft to create a new mobile service solution for our technician. In fact, T-Stream will make them more prepared while doing the service activities. For instance, the new tool runs on Windows, utilises Bing Maps and GPS systems to provide technicians with an improved, proactive service that can carry out maintenance for customers before breakdowns occur.

But there is room also to add new technologies: T-Stream will support augmented reality in the future. Thanks to the augmented reality glasses, the operator can read the instructions on how to change the sensor. Thus, it will become easier for a technician to service a forklift truck in the future. This is an example of what it is possible to achieve unlocking the power of data and taking action on it. But clearly, in this solution we put all our effort and know-how to innovate and to propose hopefully a patentable solution.

Therefore, it is important that in the new legislative framework, the protection of the companies know-how and trade secrets will be duly taken into account. In this way, companies will be free to boost innovation, to create new solutions, to develop skills, to compete, contributing to the general



economic growth of Europe.

The future has already started and we want to drive it. The future is inspiration. But only a legislative framework, which considers the complexity and the overall aspects of the emerging technology, can unlock the potential we have in Europe.



Loic Regnier, SCHNEIDER ELECTRIC SE, Strategic Influence & Thought Leadership, Leader Industry BU

How to Increase Investment in Artificial Intelligence (AI) and Ensure European Leadership in Emerging Technologies

According to a report published by the European Commission in November 2017, 66% of external investment in Artificial Intelligence (AI) during 2016 was made in the United States of America, followed by 17% in China, and 14% in Europe. In addition, PriceWaterhouseCoopers estimated that “artificial intelligence technologies could increase global GDP by USD15.7 trillion, a full 14%, by 2030. This includes advances of USD7 trillion in China, USD3.7 trillion in North America, USD1.8 trillion in Western Europe, and USD1.2 trillion for Africa and Oceania”. The report also states that “China is making rapid strides because it has set a national goal of investing USD150 billion in AI” and becoming the global leader in this area by 2030.

To change the European figures mentioned above, and promote investment in emerging technologies like AI in Europe, the European Union (EU) must continue to ensure a coordinated, cross-country, and EU-wide approach to managing such technology advances, and actively breakdown and replace disparate national policies. Schneider Electric sees four key areas where common policies and practices can help to increase investment in AI technologies in Europe:

- Data must be easy to access and combine
- Trusted data infrastructure, policies, and procedures must be implemented and monitored
- Extensive investment in skills, training, and education is needed to ensure governments and businesses are prepared to take advantage of all the benefits offered by AI
- All the possible ethical positions must be considered surrounding the development and deployment of AI

#### 1. Data must be easy to access and combine to increase investment in AI

The first and most critical consideration in being able to get the most value from AI is the ability to create a data-friendly ecosystem with unified standards and cross-platform sharing. AI depends on data that can be analysed in real time and applied to specific community problems. For this to occur, international alignment on data semantics and the creation of reference models to make data compatible, and easily integrated and aggregated to then be analysed, is absolutely critical to success.



An example of this in the industrial world is when a manufacturer might want to aggregate and optimize production data and information coming from the different industrial machines that are part of their manufacturing process, and then put that information into the context of the weather forecast to, for example, plan upcoming production that requires fine weather. Because industrial environments are often heterogeneous and customized, the machines may be manufactured by different machine builders in different countries – and those countries may be part of the EU or not – so it is essential to match the structure of the different data coming from the different inputs, in this case the different machines and weather forecasts.

If we want large and small companies to invest in AI, really invest in it and not just stay in the “proof-of-concept” phase, then data semantics, reference models, data flows, and data localization must be aligned in a single EU market (for example to be able to manage a European fleet of machines). In addition, at least the models and semantics must also be aligned at an international level. The only way businesses will invest is if it is easy for different information to be gathered and put together. If data proves to be a “roadblock” then investment will certainly be slow, so it is critical that this alignment is done at an EU *and* international level.

In addition to the example of the use of AI in the industrial world, being able to provide authorized access to de-identified data and information to be used for the purpose of accurate and valuable public research and public/private partnerships for public services is another essential requirement for investment in AI development. For example, the National Cancer Institute in the USA has pioneered a data sharing protocol where certified researchers can access and use the de-identified health data and information it has drawn from clinical data, claims information, and drug therapies. Access to such data has enabled researchers to evaluate the effectiveness of, and make recommendations on changes to, the best medical approaches without compromising the privacy of individual patients.

In terms of enhancing public/private partnerships, the ability to combine government and business data sets and information to improve municipal system performance is another way to promote investment in AI. For example, information from water pressure sensors put into context with anonymous data about the occupation level of a particular neighbourhood could allow the real-time identification of the location of hydraulic leakages across the public water network. Additional examples include the possibility of cities to integrate data from ride-sharing services with its own information on the location of social services and public transport routes to understand if it needs to look at adjusting its transportation options for residents to reduce, for example, highway congestion.

In conclusion, if data can be combined easily, and then easily aggregated, analysed, and stored in different locations for use in AI models, then this will heavily encourage investment in, and so create new opportunities for, AI in Europe. This why Europe *must* create a unique internal free market with strong interconnections and standards within the international space.

## 2. Trusted data infrastructure, policies, and procedures must be implemented and monitored

### a. Trusted data infrastructure

Collecting, storing, and working with the type of data required to feed AI needs a high level of infrastructure, reliable power, a cybersecure environment, and a robust architecture. In fact, to facilitate data processing and design effective and efficient AI models, it is necessary to invest in high performance infrastructure and encourage interactions between industry



and academia on the exploitation of high-end computing systems.

Europe should invest in deploying a European data infrastructure, including the development of supercomputers and a high-performance computing (HPC) ecosystem to process large amounts of data in an efficient and a secure way. This infrastructure should limit its dependence on non-EU suppliers for critical technologies, quantum systems computing, data centers, and power architectures. Cryptology of data and investment in other cybersecurity strategies is essential in avoiding cyber-crime interfering with European businesses and citizens and to build trust with those same parties.

Data is highly valuable when it is quality and when it is protected against any intentional or unintentional alteration, and this is why we need to build infrastructures to protect and secure it against cyber-crime or unfair competition.

b. Trusted data policies and procedures

In order to accelerate innovative services and effective AI, de-identified, geo-localised data needs to be collected. However, this then demands trusted models to be built on how data is acquired and used.

The recent General Data Protection Regulation (GDPR) goes some way to developing these models of trust because it requires an enterprise to justify the purpose of collecting private data, and forces companies to propose higher value services and closer relationships with their customers to obtain their agreement on data collection, use, and storage.

There are examples in the industrial world where we can see the direct benefits of the collection and use of de-identified, geo-localised data in trusted AI models:

- The collection and exchange of data from different machines in order to optimize the build and operation of new machines and robots requires data and AI to test and improve the capacity of machine learning
- De-identified data can be used to optimize processes and machines – however that data needs to be collected stored in order to create data model to compare real-time data to predict the consequences of machine and process drift
- Data localisation of assets like machines can accelerate maintenance when intervention is needed – for example when mobile machines need to be fixed, or when supply chain transportation and logistics information is needed to monitor an industrial fleet
- The collection of de-identified images for real-time security control – for example the scanning of a construction site with a smart camera to identify personnel working onsite without protective equipment like a helmet could sound an alarm in real time

To summarise, to promote investment in AI and allay concerns over data collection, use, and storage, companies must be transparent in the way that data is used to inform decision making by AI. And, to go further, if we expect AI to be able to report on how decisions are made, data models need to be more explanatory and ensure algorithmic decisions are easily understood by humans – for example a trusted AI model should, in the case of an incident, register the last seconds of an event before a default decision is made in order to explain the process of how the decision was made and promote understanding of the how the set limits and risks influenced



the decision. In this case it is imperative that the code and IP remain under the ownership of those who build the AI models.

### 3. Investment in skills, training, and education is needed to take advantage of all the potential benefits offered by AI

Investment in training and education is essential to develop AI, simplify and expand its uptake, and upskill people to gain all the potential benefits offered by AI, and the focus should be on user experience and on technical skills to ensure uptake is as wide as possible.

AI represents a new way for humans and machines to work together – to learn about predictive tendencies and to solve complex problems. For example, the challenges presented today in managing a process that requires tight control of temperatures, pressures, and liquid flows is quite complex and prone to error. Many variables need to be factored in to achieve a successful outcome – too many variables, in fact, for the human brain to solve on its own. With the support of AI to make better operational decisions, critical factors such as safety, security, efficiency, productivity, and even profitability can be optimized.

In addition, we can not talk about skills, education, and training without talking about the relationship between robots and AI. This combination can dramatically improve the working life of many different industries, for example by supporting the automation of repetitive human actions, and assisting with complex or dangerous tasks. In addition, the potential of AI and robots to, together, provide the ability to learn from humans and other machines, and interact with the environment, presents many benefits provided, of course, that the rules set by the builders of the AI models are followed.

One caveat to mention here is that we cannot, under any circumstances, consider AI will always be right when it is based on probability. We can take a recent customer example to illustrate this point – to try and predict whether or not manual watering of a crop is needed, AI can correlate data from connected equipment designed to measure soil moistness and tell farmers when to adjust their irrigators remotely, with real-time wind and forecasted weather conditions, and be able to help those farmers predict whether or not they will need to manually water their crops. If not, they will thereby save water and energy on pumps for irrigation. However, if the data obtained shows a 60% chance of rain and the decision made by AI (and the parameters set by the model) is to *not* water the crop, and in the end the actual rainfall is less than what was expected, the crop will still require watering. This shows that we still require human intervention, and thus the skills, training, and education to work *with* AI and to also *teach and guide* AI in becoming valuable for humans.

One last point on learning – the beauty of AI is that self-learning becomes increasingly probabilistic and predictive, rather than fully determinative. The need for humans to retain control and provide judgement where it is needed to stop AI heading in the wrong direction can only add to the sophistication of AI in the long run – again human accompaniment to AI (with the right skills, education, and training) is imperative.

### 4. Ethical considerations regarding AI

Following closely from the point above about the relationship of the human skills, education, and training needed to work with AI is the discussion on the ethical considerations to be



made around AI. Humans will always be at the centre of the decision to implement an AI model and, thus, the following question should be asked every time a decision to implement AI is made: What will be the impact of the AI decision on humans?

Ethical considerations around the implementation of AI are of same level of concern as the economic considerations of AI. Not only do we need to invest in the technical skills of programmers, designers, and coders, but we also need to teach philosophy, sociology, or psychology alongside AI. It is important that the different skills for the design, validation, control, and audit of AI models are accessible to diverse people and groups in order to provide well-rounded ethical considerations on any AI model.

## Conclusion

AI brings with it the anticipation of integrated technologies that can be put to use to increase the well-being of humanity and more effectively use our planet's resources by using and adapting existing rules and providing explanations on the intention of these technologies, and ensuring the "human factor" remains in the development and deployment of, and responsibility for, such technologies.

The creation and implementation of trusted data infrastructure and policies about the use of AI will accelerate the investment and the usage of it, and so the potential benefits received from it. Personal data should not be used without our consent and without a clear purpose of value, but the value of de-identified non-personal data to the adoption of AI cannot be understated. This is why ethical considerations and human intervention is so important to the discussions around AI.

Human choices about AI development affect the way in which decisions are made and the manner in which they are integrated into organizational routines. Exactly how these decisions are made need to be better understood because they will have substantial impact on the public soon. AI may well be a revolution in human affairs and we will have solution for many existing issues.

Europe's vision and orientation must be ready to welcome and guide one of the most influential human innovations in history.



Razvan POPA MEP, (S&D Rumania), Industry, Research and Energy Committee

Industry is one of the pillars of the European economy - the manufacturing sector in the European Union accounts for 2 million enterprises, 33 million jobs and 60% of productivity growth.

We stand on the brink of a new industrial revolution, driven by new-generation information technologies such as the Internet of Things, cloud computing, big data and data analytics, robotics and 3D printing.

All those elements open new horizons for industry to become more adventurous, more efficient, to improve processes and to develop innovative products and services.





Recent studies estimate that digitalization of products and services can add more than €110 billion of annual revenue in Europe in the next five years.

European industry is strong in digital sectors such as electronics for automotive, security and energy markets, telecom equipment, business software, and laser and sensor technologies.

Europe also hosts excellent research and technology institutes. However, high-tech sectors face severe competition from other parts of the world and many traditional sectors and small and medium enterprises (SMEs) are lagging behind. There are also large disparities in digitalization between regions.

The industrial revolution of our time is digital.

We need the right scale for technologies such as cloud computing, data-driven science and the internet of things to reach their full potential.

As companies aim to scale up across the Single Market, public e-services should also meet today's needs: be digital, open and cross-border by design. The EU is the right scale for the digital times.

Europe has a very competitive industrial base and is a global leader in important sectors. But Europe will only be able to maintain its leading role if the digitization of its industry is successful and reached fast. The new proposals aim to ensure that this happens. It requires a joint effort across Europe to attract the investments we need for growth in the digital economy.

The digital economy merges with the real economy. We need leadership and investment in digital technologies in areas like advanced manufacturing, smart energy, automated driving or e-health.

The EU data economy was estimated at €272 billion in 2015 (annual growth of 5.6%) and could employ 7.4 million people by 2020.

Data can be used to improve almost every aspect of daily life, from business analysis to weather forecasting, from new era in medicine enabling personalized care, to safer roads and fewer traffic jams.

On the other hand, I believe that the Member States must be involved in cross-border projects exploring emerging data issues in a real life situation.

Last but not least, I believe that the European budget needs to pay the greatest attention to projects aimed at helping digitize the economy, but also to increase citizens' digital competences.

Digitizing industry cannot and should not be prioritized without simultaneously investing in increasing people's digital skills, which is today one of the biggest challenges for the education system and for the labor market as well. Otherwise, these tremendous changes will have unwanted side effects in society.



Francis ZAMMIT DIMECH MEP, (EPP Malta) Legal Affairs Committee

## 1. The future complexities around data for the technology industry

### General Background

The volume of data is skyrocketing as diverse data sources, processes and systems show unprecedented growth. Companies are trying to capture and store everything, without first establishing the data's business utility. The fact is, technology is enabling this proliferating data complexity -continuing to ignore the need for an enterprise data strategy and information management approach, will not only increase "time to insight," but it may actually lead to incorrect insights.

Companies must act now to focus, simplify and standardize big data through an enterprise data management strategy. Otherwise, technology will drive increasing data cost, complexity and inefficiency; companies will be unable to benefit from advanced analytics like machine learning; and they will be unprepared for the next wave of data growth triggered by new technologies like IoT and block chain. Companies that do not act now will find themselves at a disadvantage.



## 2. Unlocking data and artificial intelligence

Artificial Intelligence is totally transforming our economy, our culture and our society.

### General Background

What is Artificial Intelligence? Artificial intelligence refers to systems that display intelligent behaviour by analysing their environment and taking actions, with the hope of achieving specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants). We use AI on a daily basis, e.g. to translate languages and generate subtitles and block e-mail spam. Many AI technologies require data to improve their performance. Once they perform well, they can help improve and automate decision making in the same domain.

### Domains Using Artificial Intelligence

**Agriculture:** Many farms across Europe are already using AI to monitor the movement, temperature and feed consumption of their animals. The AI system can then automatically adapt the heating and feeding machinery to help farmers monitor their animals' welfare and to free them up for other tasks.

**Manufacturing:** AI is aiding manufacturers to become more efficient and to help factories return to Europe.

These are some of the various examples of how AI can have a positive effect on various sectors, from energy to education, from financial services to construction.

### The Importance of Data

Where data is inaccessible, precious insight is lost. For example, a doctor who is seeing a new patient for the first time may be frustrated to find no detailed medical history because the patient has recently moved from another hospital. The consequences of inefficient data transfer can be more severe.



Hospitals that lack data are prevented from making optimal, evidence-based decisions or from adopting the latest technologies. This means they cannot accurately forecast demand, collaborate on improvements to clinical pathways, or undertake other projects that would help improve personal, technical and allocative value.

To improve outcomes and achieve a truly integrated, multidisciplinary system of care, data management must be top of the agenda.

Using AI and analytics tools, clinicians will then be able to access and interrogate this trove of data much faster and more easily. Having it all in one place also streamlines the process of sharing data when needed.

Integrated, clean and consolidated data will help them to predict needs, model outcomes and measure patient value accurately.

An algorithm's pattern-recognition speed and capabilities outpace those of even the most seasoned clinicians, drawing out previously unrevealed correlations and insights that inform the work of doctors. To illustrate, AI algorithms can identify correlations between the types of sutures used on specific kinds of injuries, as well as the likelihood of infection.

#### Artificial Intelligence and the EU

The EU ought to adopt a coordinated approach to make the most of the opportunities offered by AI and to address the new challenges that it brings. The EU has the potential to lead the way in developing and using AI for good and for all.

Examples would be:

- World-class research, labs and start-ups.
- The Digital Single Market - Common rules, for e.g. on data protection and the free flow of data in the EU, cybersecurity and connectivity help companies to do business, scale up across borders and encourage investments.
- A wealth of industrial, research and public sector data which can be unlocked to feed AI systems. In parallel, the Commission is taking action to make data sharing easier and to open up more data, the raw material for AI, for re-use. This includes data from the public sector in particular, such as on public utilities and the environment, as well as research and health data.
- In parallel, the Commission has adopted a proposal for a recast of the directive on the re-use of public sector information (PSI directive). It is proposed to widen the scope of the directive in order to cover public undertakings operating in the water, energy, transport and postal services sectors and those acting as public service operators. This corresponds to an extension that also goes in the right direction and should offer new opportunities in the future for statistical offices to access new data sources. The proposal also includes new provisions such as the obligation to make dynamic content (e.g. traffic data, satellite data, weather data) available immediately after collection as well as the definition of free of charge datasets of high-value for re-use, which are also elements going in a positive direction.

European leaders have put AI at the top of their agendas. It is time to make significant efforts to ensure that:



- Europe is competitive in the AI landscape, with bold investments that match its economic weight. This is about supporting research and innovation to develop the next generation of AI technologies, and deployment to ensure that companies are able to adopt AI.
- No one is left behind in the digital transformation. AI is changing the nature of work: jobs will be created, others will disappear, but mostly will be transformed.
- New technologies are based on values. The General Data Protection Regulation has become a reality on 25 May 2018. This was a major step in building trust which is essential in the long term for both people and companies.
- The EU should ensure that AI is developed and applied in an appropriate framework which promotes *innovation and respects the Union's values and fundamental rights* as well as ethical principles.

#### Making more data available

AI needs vast amounts of data to be developed. Machine learning, a type of AI, works by identifying patterns in available data and then applying the knowledge to new data. The larger a data set, the better even subtle relations in the data can be discovered. When it comes to using AI, data-rich environments also provide for more opportunities. Deep learning has been a game-changer for AI with a tremendous improvement in performance for specific tasks such as image or speech recognition, or machine translation.

Training a deep learning algorithm to classify objects works by exposing it to a large number of labelled examples (e.g. pictures of planes). Once trained, algorithms can correctly classify objects that they have never seen, in some cases with accuracies that exceed those of humans.

Significant advances in these technologies have been made through the use of large data sets and unprecedented computing power.

#### Preparing for socioeconomic changes

The emergence of new technologies, from electricity to the internet, has changed the nature of work. It has brought major benefits to our society and economy, but also raised concerns.

The emergence of automation, robotics and AI is transforming the labour market, and it is essential for the EU to manage this shift.

These technologies can make workers' lives easier. They can, for example, help them with repetitive, strenuous and even dangerous tasks. They can also help summarise large amounts of data, provide more accurate information and suggest decisions, including using AI to assist doctors with diagnosis. They ultimately help to enhance people's abilities. Against the background of an ageing society, AI can provide new solutions to support more people to participate and remain in the labour market, including persons with disabilities. New jobs and tasks will emerge as result of AI, some of which are difficult, or even impossible to predict.

#### New methods of data collection - EU Privacy Regulation

When big data includes data that is collected or observed by apps or devices rather than provided directly by individuals, it can be more challenging to provide a privacy notice, but it is possible to address this issue with the following example:

- Privacy in mobile applications: the Data Protection Act (DPA) exists to protect individuals' privacy, just as with any other business or project, you need to comply with the DPA when



developing a mobile application (app). The mobile environment has some particular features that make privacy a pressing concern.

Mobile devices such as smartphones and tablets are portable, personal, frequently used and commonly always on.

A mobile device typically has direct access to many different sensors and data, such as a microphone, camera and GPS receiver, together with the user's combined data including email, SMS messages and contacts.

There are many different app configurations possible, and it is not necessarily obvious how an app deals with personal information behind its user interface.

Mobile devices often have small screens, typically with touch based interfaces. This can make it more challenging for apps to effectively communicate with app users.

Consumers' expectations of convenience can make it undesirable to present a user with a large privacy policy, or a large number of prompts, or both.

- The EU's Article 29 Working Party looked at data protection issues associated with IoT devices, focusing on wearable computing such as watches and glasses, devices such as activity trackers, and devices in the home such as smart thermostats. They are of the view that privacy information could be provided on the device itself, or by broadcasting the information via Wi-Fi, as well as making it available through a QR code.

#### The EU Privacy Regulation and Artificial Intelligence

The EU Privacy Regulation provides that individuals: "shall have the right not to be subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her".

Exceptions to such rules apply when an automated decision is either provided by the law, such as in the case of fraud prevention systems, or is necessary to enter into a contract or is based on the individual's prior consent. But, in the latter two scenarios, individuals will still have the right to obtain human intervention to express their point of view and to contest the decision which is commonly known as the right to receive a justification of the automated decision.

The most frequent example is when a mortgage or a recruiting application is turned down since, according to the system, the applying individual does not meet some parameters. However, the main issue arises when AI becomes so complex and its decisions are based on such a large number of data that is not actually possible to give a justification of a specific decision.

The solution might be that artificial intelligence whose decisions might impact individuals shall be structured in a way that it will be possible to track the reasoning of the decision. But this also depends on what level of justification would be sufficient to meet the criteria set out in the EU Privacy Regulation. Is it sufficient to say that the applicant for a mortgage did not meet the creditworthiness parameters? Or it will be required to identify the specific parameter and if the parameter has become relevant only because it was linked to a number of other parameters.

#### Artificial Intelligence in Malta

Professor Georgios N. Yannakakis, an associate Professor within the Institute of Digital Games at



the University of Malta and author of the first comprehensive textbook on artificial intelligence (AI) and games, has a lot to say about AI in Malta. He has reiterated that an EU funded project he and his team were recently working on, was a game that could detect what type of dyslexia a user has, making it easier for the educator to deal with the situation at hand. He is also working on a project 'Envisage', which is also an EU funded project about transferring the mature technology of games analytics to classroom analytics. This means that behavioural patterns of students would be analysed and visualised to help teachers teach better.

As one can see, AI is a hot topic at the University of Malta as it is anywhere else in the world. Malta has the potential to play an integral role in developing the next generation of AI. This is especially true in the light of the fact that an AI summit will be held in Malta between 12 and 13 July this summer. Here, researchers will be conducting an extensive exploration into the fields of AI and Machine Learning whilst connecting the audience with the pioneer researchers, innovators, technicians, robotics, and future regulators to provide the attendees with answers to their questions and foresight into the future.

#### Conclusion

Information is power. If you can unlock data's disruptive force, you have the potential to reap revenue-generating rewards such as: prevent business- interrupting risk, personalize communications with customers to build loyalty, and identify new markets for growth. For the companies, just because you recognize data's value, does not mean you understand it or trust it once you have it in your grasp.

Leaders should balance their instincts with enhanced, data-driven insights.

Our world is awash in data, but we cannot be overwhelmed by its volume and omnipresence. Data and new ways of using it will help us resolve the problems of tomorrow.

It is a challenge worth working, though, because within that sea of data lie answers to the problems we'll be facing tomorrow.

## UNLOCKING DATA AND ARTIFICIAL INTELLIGENCE



Roland Norden, ROBERT BOSCH GmbH, Research Manager, AI Validation & Verification

Bosch is one of the world leading international providers of technology and services in the business fields of consumer goods, energy and building technology, industrial technology and mobility.

The core objective of Bosch is to develop innovative, useful, and exciting products and solutions to enhance the quality of life. One example is the ABS, the Autonomous Breaking System, which was introduced by BOSCH to vehicle series production in 1978.

As for the ABS system, BOSCH applies the same high standards used for classical products to AI-based technology, continuing to make products safe, robust and explainable.



Compared to a classic product like the ABS, AI-based systems often act in an “open context”. The activation of the ABS system is always triggered by the driver, whereas for an autonomous vehicle the decision process is done by the AI system.

In order to safely operate in traffic, AI systems used in autonomous vehicles have to perform several complex functions. One of those functions is, for example, the camera-based detection of vehicles in real world conditions. To execute detection, the AI system has to face the so-called “open world” challenges, which require solutions based upon not fully determined premises, such as defining what a “vehicle” is. Furthermore, those challenges are subject to constant variables, like the change in vehicle design, dimension, etc.

The safety of ABS is fully achieved fulfilling common, established standards. In a similar way, in order to ensure safety in AI systems, fundamental premises and requirements should be commonly developed thanks to data platforms, enabling collaboration and data exchange between the relevant stakeholders. Improvements and continuous updates should feed the platform and its outcomes.

It is, then, on the basis of those common standards, that benchmarking, testing and innovation excellence become possible.

Consequently, new technologies can be tested on the basis of common data sets developed on the platforms. For example, the detection rate of “vehicles” could be then analysed as a common release criterion for autonomous cars. However, to design safe and robust systems is essential not just to prove that vehicles *are* detected, but also, *why* objects are defined and detected as “vehicles”.

On a classic systems such as the ABS, the working principle can be explained by analysing functional elements such as the speed sensors, cables and the valves. Analysing those components, unexpected behavior can be excluded. For complex AI systems, different methods of “Explainability” can be used accordingly to understand the working principle. One possible approach is, in our example, highlighting the decision relevant pixels in the pictures, showing which ones are the “vehicle-relevant” elements that define it. Therefore, to prevent unexpected behavior, it becomes essential to claim common minimum standards for Explainability.

In conclusion, if we want to introduce trustful, safe and robust AI technologies, it is necessary to set common foundations by enabling collaboration platforms where to build explainability and safety standards.



Leo Kärkkäinen, NOKIA CORPORATION, Chief Officer Artificial Intelligence, Bell Labs Fellow, Leader of Deep Learning Research Group, Nokia Bell Labs  
Professor of Practice, Aalto University, School of Electrical Engineering

Significant Advances in AI, particularly in a Subfield of Machine Learning called Deep Learning

With a huge increase of available data and computational power we have reached a stage that we can create software for very complex cases, like classification of natural images. This is done by creating programs that learn from examples without explicit programming by humans. Deep



learning (DL) has shown significant advances in many tasks, like automatic speech recognition, where previous decades of work were mired in stagnant progress.

### Complex systems

Now, DL allows mankind to tackle problems that have been, so far, too difficult to handle as the existing rules, although clearly expressed in the resulting models, seem to be extremely intricate, complex and hard to fathom.

We have a similar dilemma in mathematics in the field of computer assisted proofs, where computer generated reasoning involves so many logical steps that they are not in any practical means verifiable, nor explainable by human beings.

However, experimental, practical sciences, have long used data from experiments (data) to find out relations that are consistent, even if the explanation of the deep nature of the relation has remained vague, much beyond the bare experimental finding. For, example the causal root of some medical treatments for curing the patient has been, and very often still is, in shadow – and just supported by data sets from clinical studies, which state that they seem to work for most of the time, and the benefits out-weight the side-effects. The secrets of life, the biochemical and physiological processes involved, have often remained elusive. If we do not understand how a drug works, do we forbid it? No, we require that we are shown the experimental, statistical evidence, the data, that supports it.

Should we be doomed to consider only things that are simple enough for us to understand?

No, luckily our culture allows us to specialize, and combine knowledge, via a scientific process that allow the human kind to build a bigger picture - bigger than any single person can envision.

The data set will contain the ethics, which the trained model is going to follow

As a computer is trained to do a task, by showing examples, it is of paramount importance that the training sets are of good quality. For example, if a self-driving car is programmed from the data on how people actually drive, the system will have the ethics of an average person. Sometimes it will drive against the red lights, because people do. I do not think that this is what we want. Hence, the training datasets have to be pruned and curated to contain non-biased, ethical examples. As with humans, giving a good example is the best way to teach and train.

Also, using the data sets from human decisions (e.g. hiring) one can build a model of the current decision process, and one can find out, if it contains evidence of biases, say, against gender, age or origin. Modern machine learning gives us a way to prove and root out bad undercurrents in our own decision making.

The scientific process is based on trust, sharing of data, and the ability to challenge it. For intelligent computer systems this requires that, if people are subject to algorithmic decisions the training data for those decisions should be public (anonymized) and challengeable.





Models that are complex enough to reflect human behaviour are disrupting the industries and services

Our ability to model human complexity level behaviours using vast data sets allows for a disruption in our economy. Also, using computer power, it has simplified the human side of the task. Machine translation from one language to the other, according to Google, had until just recently 500 000 lines of codes. Creating this required, I am sure, a lot of expertise and effort, suitable for a company of the size of Google.

Currently, their code for the task, with better performance, is 500 lines of code. This level of effort is much closer to what SMEs can do, provided that the data sets and the computational power is available. We in Europe have a highly educated workforce, which combined with a possible concentrated effort in creation of European annotated and curated datasets, and with the access of needed computer power, can make Europe the centre of AI innovation.

US and China have large companies that have the ability to gather large data streams. Because of the importance of the data, it is not the academic institutions, but the industry that has been leading the race.

Annotation of data sets is where the main effort lies

Quite a lot of the data is in public domain. However, the real value of the data set comes from its annotation. ImageNet database had web-addresses of images combined with people's estimations of what they contained. This is annotation – and for the millions of needed images it is expensive to produce, for some domains like medical x-ray images, it is particularly expensive.

Because this is the part where huge investments are already currently made by the leading industry, there are issues of ownership and fair compensation for sharing.

Even beyond that, as the valuable data sets are about human behaviour, they are actually data about us all, and one can question if data of our behavioural traits can be owned by someone, even more so than our DNA sequence.

Finally, one may ask, why is the data about human behaviour so important? It is, because self-driving cars have to be able to judge the intentions of people in the traffic, a robot, working with humans in manufacturing or health sector (I do not think we will keep robots in boxes, if we really want to have an impact) has to be able to mingle in and be part of the working team.



Luc Deleu, OMETA, Chief Executive Officer

AI is not new – but today's evolutions in various areas are making it possible

Artificial Intelligence is not new, but the availability of computing power, new technologies to capture enormous amounts of data points and the speed by which we can connect, store and analyse data give new insights and oppor-



tunities that can lead to business performance breakthroughs, new business models and changing markets. Thanks to the combination of the technologies that are available today, the speed by which the industry can learn from its processes, products and customers will increase exponentially.

The digital representation of a physical product will feed AI with new insights

The digital representation of a product is a collection of all the available data that we can gather throughout the whole lifecycle of that specific product. It stores the unique values of the product in all phases: in development and pre-production, during manufacturing and when the product is actually used in the field. Humans are not able to process this large amount of data.

However, new technologies and AI allow us to convert this information into knowledge. As a result, the digital representation allows us to learn from each step of the lifecycle of a single product.

How can AI learn from these representations? We can compare characteristics of the product (e.g. quality or the lack thereof) with its digital representation. This allows us to discover new correlations. These correlations deliver us new insights of the product and its production process. By comparing several individual digital representations, we can discover:

- differences in production temperature, machine setups, machine handling, etc
- changes of suppliers, materials, versions of subassemblies, etc
- different production lines or plants, teams, skills of operators, etc

When we look at the quality of a product, the correlations that can be found thanks to big data and AI, allow us to understand new reasons that determine the quality of a product and it can even turn quality into a predictable element.

Nowadays, we are focusing on the production process and we try to find changes in correlation with the related quality. We are currently running a 'smart manufacturing project' that has already proved that we can discover and apply process adjustments which could not be discovered without the help of AI concepts. When we look at the entire product life cycle, this example shows that we are still focusing on the production phase.

Closing the production lifecycle loop will change business models

The next big step is closing the product life cycle. Digital representation should not only cover the digitization of the production process but also the usage of each individual product when it goes to market. Imagine, if we could also digitally follow the actual usage of a product by its consumer, assumptions during engineering (pre-production) could be validated, neutralized and improved.

So what can the industry gain by closing the full product life cycle loop? Today we are confronted with the fact that our industry is still based on mass production with short life cycles of the products (sometimes not more than two years). Bad quality is not necessarily the reason for this short lifetime, but it is the profits that drive these short lifetimes. Today profit is made during the cycle 'engineering up to production'. After the product is sold, a 'customer disconnection point' emerges.



Therefore, if we were to continue processing data via the digital representation once the product is sold, new business models emerge. We could shift towards a market in which the industry stays connected with its products and where it would have no benefit to produce enormous amounts of products with short lifecycles. In contrast, connected products would lead to a better understanding of customer usage and experience. When products stay connected with their industrial producer throughout their whole life cycle, then quality, new product introductions and services can be improved.

### From mass repetitive manufacturing to mass custom manufacturing

In previous decades the growth market for industry was defined by mass repetitive production and low labour cost. Consequently, many of our production facilities moved to countries with a lower labour cost such as China.

The digital representation and available AI concepts will become a game changer. Not labour cost, but knowledge will drive the market. As data becomes information, information turns into knowledge thanks to AI and knowledge will lead to better customer understanding. This will allow us to move from a mass production industry towards a smart service market where products become customer specific and production will become a 'one piece flow'. This means that each production order on the production line will be pre-ordered with tailored demand. This will allow our industry to make a shift from mass repetitive production towards mass custom production.

This can only happen if we stay connected with the user/consumer and the product/service that we deliver throughout the whole life cycle. By continuously collecting the enormous amount of data points and using smart AI learning systems, we will be able to create customer specific product designs and increase the speed and intelligence of our production processes. This would also create a competitive advantage against the repetitive mass production model with its low labour cost.

Daniel DALTON MEP, (ECR, UK), Internal Market & Consumer Protection Committee and Civil Liberties, Justice & Home Affairs Committee

Contrary to popular belief, artificial intelligence (AI) is not new. It is already embedded into our daily lives and we are entering a crucial stage in its development.

However, before we can effectively regulate this growing industry, we have to understand and define the boundaries of what exactly it is we are trying to regulate. Therefore, we need a clear definition of AI to be developed.

For politicians, our main concerns have to be around the ethics of AI and the impact on jobs. Recent research has shown that currently as few as 11 % of adults are above the skill sets of some AI. It is hardly surprising then that at the forefront of the ethical concerns





around artificial intelligence is the effect it will have on the job market. The shift towards AI performing more and more of the day-to-day tasks currently performed by humans, can appear a scary prospect; what will those people go on to do? As with previous technological revolutions, jobs will disappear. The shift to AI will not mean a loss of jobs but a shift in the types of jobs. The AI industry will generate more, higher skilled jobs, and this means a change in our education systems is indeed needed, and quickly.

These new technologies are not operating within national boundaries - international players can quickly move jurisdiction and many of these new technologies will have global use. Therefore, the EU cannot risk being left behind by the rest of the world. We should not make the same mistakes that we made with GM foods, where we saw the rest of the world go ahead with GM foods and so leaving us behind.

If we do not encourage and make the most of our flourishing AI industry, then Asia and the United States will quickly outstrip us. If this is a leading industry of the future, then it follows that it is also a leading job creator of the future. In turn, if we unintentionally restrict AI development in Europe, it will mean that the jobs generated by this new industry will be outside of the EU.

There is a fundamental problem with the development of EU law in this area however. It is too slow.

Legislators cannot keep up with the development of technology, and we are seeing that the GDPR is already out of date, even as it is just being implemented. How the GDPR will apply to Blockchain being one example. With the trend in the Platform to Business and New Deal legislation towards requiring transparency around algorithms, this also has serious implications for the Blockchain and other innovators as it is akin to making trade secrets public, and will prevent further innovation.

As AI increasingly embeds itself into our day-to-day lives, we will see President Putin's prediction that whoever controls algorithms will control the future come to fruition. This is a scary prospect if such power falls into the wrong hands.

ORGALIME Malte LOHAN, Director General

#### Next Steps

- AI has the potential to drastically transform the societal and economic landscape.
- As Vice-President Ansip said: The development of AI would have the same transformative impact as electricity or the steam engine.
- You may agree or disagree with this statement but there are bigger changes on the horizon – cybersecurity applications, arrival of self-driving cars, factory automated production processes, precision medicine, just to name a few.
- And our collective responsibility will be to shape a framework around AI that will actually enable Europe to truly reap the benefits behind the enormous potential this emerging





technology entails.

- But let us not forget the end goal here. AI must be controlled by humans and must serve humanity for the good of society.
- In this context, allow me to quote the late Stephen Hawking: “Perhaps we should all stop for a moment and focus not only on making our AI better and more successful but also on the benefit of humanity”.
- But we also have to face reality and overcome the current obstacles: The European Union will only be a real leader on AI until its Member States choose to pool together their financial and human resources and share a real digital single market.
- In this respect - and if AI is to be treated as a true European Added Value - then the national strategies that have been and are currently being drafted by several Member States only make sense in a coordinated EU framework.
- To have a naïve approach to this topic will be to the detriment of Europe’s global future competitiveness. This is why we need answers to the tough questions that are ahead of us, the ones that touch upon the different pieces of the bigger jigsaw puzzle that will be AI - on ethics, employment, safety, liability.
- And of course data - I think it is quite clear that we need to reach a balanced approach between open data and sensitive data, such as business data. And how we deal with data protection in general is a challenge that we will all have to tackle. All of this still requires a lot of work in Europe.
- You can be rest assured that the Data Protection Authorities in Europe understand the importance of AI. At the last international conference of the Data Protection Authorities Commissioners, more than a day was spent discussing this exact issue in the context of AI.
- Let me end tonight’s debate on a positive note:
- We have to remain optimistic. I believe that the ethical, legal and social issues are not just a constraint on emerging technology innovation, but should be the key to creating technology for human flourishing.
- After all, shouldn’t the regulatory framework around AI support our industry’s chances in providing new AI-based solutions to address the critical societal challenges?
- The European Technology Industries can make a real innovative and competitive difference at global level, notably embedded AI and industrial applications.
- These are precisely the areas where European industry, combining AI, automation and edge-computing, can carve out global leadership.
- And while USA and China are putting forward very ambitious AI strategies, we have some catching up to do
- That is why the role of the AI High Level Group in the coming months will be crucial in contributing towards an ambitious and forward-looking AI strategy of our own.
- Thank you again to all of you for being with us this evening. Thank you especially to our



host Ms Virkkunen, to your colleagues from the European Parliament, to the European Commission, and to all our industry speakers.

- This discussion will be one of many to come. Your contributions have provided much food for thought, and we look forward to deepening our engagement on the key issues around AI over the coming weeks.

CONCLUDING REMARKS

Antony Fell, EUROPEAN FORUM FOR MANUFACTURING, Secretary General

As you know, the European Forum for Manufacturing brings together the European Parliament, Commission and manufacturers across Europe to debate policies relating to European manufacturing.

The next European Forum for Manufacturing Roundtable Dinner Debate on Multi-Annual Financial Framework and Support for European Manufacturing takes place here in the European Parliament on Wednesday 26 September.

It will be chaired by Christian Ehler MEP and Commissioner Oettinger has been invited.

Our thanks to Henne Virkkunen MEP for her excellent chairing, to the MEPS who have both listened and contributed, to the companies and to our sponsor Orgalime.



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