SPECIAL COMMITTEE ON ARTIFICIAL INTELLIGENCE

IN A DIGITAL AGE (AIDA)

Webinar on AI with experts from the European University Institute

Current state of play in AI research and applications

BRUSSELS

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1-002-0000

IN THE CHAIR: DRAGOŞ TUDORACHE
Chair of the Special Committee on Artificial Intelligence in a Digital Age

(The meeting opened at 13.48)

1-003-0000
Chair. – Thank you very much and good afternoon to all the Members, colleagues, speakers and guests for today's webinar. Happy New Year and best wishes for 2021, hoping that this year will be at least slightly better and more normal than the one we've left behind.

A very warm welcome to this first activity of AIDA in the year 2021, a webinar where we will have the occasion to interact with colleagues from the European University Institute, an institute with a long-term, long-standing cooperation with the European Parliament and its services and a very valuable contribution through its work, through its research, through its studies, to the objectives that we also hold dear here in the European Parliament.

Particularly relevant is the work that the Institute has done on artificial intelligence, of course, the bread and butter of our committee, which is why the Parliament has approached AIDA to offer the possibility for interacting with our Members through such a webinar to present their work and also give the opportunity to our Members to ask questions, to get more clarity as to the tradition of the Institute on working on artificial intelligence and the accomplishments to date.

In terms of format, we follow somewhat a similar structure for all discussions as the one that we already started using in the course of the last year. Next to me, I have the pleasure of opening this webinar together with Ms Edina Tóth, our Vice-Chair and our rapporteur Mr Axel Voss. I will give them the floor now at the start for their brief interventions of three minutes each. Afterwards, we will hear from the experts themselves. We have a 20-minute slot for their presentations and then we will move to the exchange with our Members – we have our list, unfortunately today we can only do one round – through the representatives of the political groups and there we will also use the same structure of the discussion: question, intervention from the Member, the question addressed to one or several of the speakers and then immediately the answers from the experts to the question at hand and then we move to the next Member and so forth. And then at the very end some closing remarks from the rapporteur again and also from the Chair. Here I would like to, from the outset, apologise. I have another engagement and therefore I will have to withdraw from the debate at some point and I'm very grateful and I'd like to thank Ms Edina Tóth for agreeing to take over the Chairmanship of this webinar. So, she will be the one chairing the exchange, the interventions and also the exchange of views with the Members and, therefore, also she will be the one doing the closing remarks at the end of the webinar.

Before we move on to the business at hand, I would like to also remind the fact that we have on 27 January, I know you know it, I hope it's very clearly marked in your agendas, but I do my duty as a Chair and remind that Wednesday the 27th, we have our hearing on AI and the Green Deal. We have a very good line-up of experts and speakers and I do expect that it will be a very interesting debate, very rich in terms of the experiences that will be brought to bear in the discussions. And then also on 1 February we will have a coordinators meeting. So, without

further ado, I pass the floor to Edina Tóth, our Vice-Chair of AIDA and then right after that to Mr Axel Voss, the rapporteur. Ms Tóth the floor is yours.

1-004-0000
Edina Tóth (PPE), *Vice-Chair***.** – Good afternoon to all of you and, dear Dragoș, please allow me first of all to wish you a very happy birthday. And I would also like to wish all of you a very happy New Year and welcome our guests from the European University Institute.

We are very pleased to have this opportunity to hear from the institute's experts today on a range of important research questions linked to artificial intelligence. Part of our committee's mandate is to look at the long term when thinking of how Europe should regulate AI.

This seminar will provide us with one of hopefully many more opportunities to exchange views of experts such as the professors we are welcoming today with the goal of working towards our mandate with as much expert input as possible. I would also like to take this opportunity to reiterate the importance of having more female researchers on the field of artificial intelligence and on other emerging technologies.

On that note, I'd like to encourage our colleagues and panellists today to think about the persistent problem of the gender gap in STEM subjects in the EU, and how discussions like today can contribute to finding a solution on this important issue at European academic institutions and other research organisations.

I'm very much looking forward to the discussion and hope that our Members will have the chance to gain more in-depth insight on AI which will guide our work in the AIDA Committee. And with these opening remarks and I would like to pass the floor to my dear colleague the AIDA rapporteur, Mr Axel Voss.

Thank you Axel, the floor is yours.

1-005-0000
Axel Voss (PPE), *rapporteur***.** – Thanks, Edina, and thank you Dragoș, and a very happy birthday from me too. Allow me to once again wish you all a very happy new year. Stay safe and stay positive.

One thing has to be said about the topic we'll be considering again today: this technology is now of strategic importance. It is here that most innovation is happening in the field – although sadly not in Europe.

We therefore have to get used to the fact that in this area we need to do whatever it takes to become more competitive, more innovative. We need more investment, but also more data. Here as well we need enough data to train algorithms; and we need to create an environment which makes this possible.

This committee has a mandate to produce a report exploring the key aspects of artificial intelligence. One of the key building blocks is, of course, data, which I've just mentioned. Another is cybersecurity. As more and more aspects of our lives move online, the issue of cybersecurity is coming to the fore.

We have unanswered questions on patents, ethical matters and framework conditions. Liability is another grey area. We are making progress on all of these fronts.

But I also think that we need a strategy, a roadmap charting how Europe can not only survive in a digital world but lead the way on artificial intelligence.

That is why it is so important for us that you are here today to give us new ideas which can feed into legislation and our efforts to become more competitive.

So thank you for joining us today. I look forward to an enjoyable conference and a fascinating discussion.

1-006-0000
Edina Tóth (PPE), *Vice-Chair***.** – Thank you very much, Axel, for your opening remarks.

I would now like to welcome our speakers for today, Dr Francesca Lagioia, Professor Nicolas Petit, Professor Giacomo Calzolari and Professor Giovanni Sartor, who, if I understood correctly, will not be making a presentation, but will be available for the question and answer session with our Members.

I give the floor to our first speaker. Francesca, the floor is yours.

1-007-0000
Francesca LAGIOIA, *European University Institute***.** – Thank you for giving me this opportunity. Good afternoon everyone.

We were asked to cover some building blocks of artificial intelligence and, in particular, machine learning, artificial neural networks and deep learning. We are happy to provide an overview on that as the first block of today's presentation so many of you will already be aware of some of these notions.

Let me first introduce the concept of artificial intelligence. AI builds machines that perform functions that require intelligence when performed by people. It certainly provides great opportunities for individuals and world society with regard to sustainability, health and the possibility of increasing knowledge, and also to spread such knowledge. But it also involves some significant risks, such as, for example, unemployment, discrimination and exclusion.

So the challenge is how to support useful AI applications while preventing harm to individuals and society. In the picture on the right, you can see how many tasks can be performed only by humans and those that currently can also be performed by AI systems, such as, for example, composing music in the style of Bach.

We often distinguish between strong artificial intelligence, also known as general artificial intelligence, and narrow artificial intelligence. Strong general artificial intelligence consists in systems that exhibit most of the human cognitive skills, possibly at a superhuman level. It does not exist yet, but it will possibly, or even probably, exist in the future.

So the question is whether, and when, we will face a future existential risk. What we have now is only the so-called narrow specific artificial intelligence, namely systems that are capable of carrying out some single specific tasks that usually require intelligence at a satisfactory level. Narrow AI is already with us. Just think of, for instance, automated translation systems, autonomous vehicles, and decision-support systems that are used in the health-care domain, as well as, for instance, in the justice domain.

Specific artificial intelligence raises a number of legal and social issues. The public perception of artificial intelligence, as well as public and private investments in AI, as we all know, have gone through ups and downs. Now we are on a high and we have to see what is next – another winter, a consolidation or an AI explosion. The drivers of artificial intelligence's success are certainly big data and machine learning.

Until recently, the focus was on AI systems, based on the human representation of knowledge, to be used through automatic reasoning. However, as I have already mentioned, the success of AI is due to the transition from the knowledge-based approach to machine learning. Thanks to machine learning, computers create knowledge by learning from examples and correlations. Here you can see the three main approaches to learning and the differences between them, namely the supervised learning, the unsupervised and the reinforcement learning approach.

Currently one of the most popular approaches is supervised learning, in which the system is provided with a set of examples tagged with the correct solutions. So, for example, a set of animal pictures tagged with the name of each animal. By using a learning algorithm, the system builds a learning algorithm model and uses it to label new pictures with the correct name of the animal. So, for example, a new picture of a dog will be automatically labelled as a dog.

One of the most popular approaches consists in artificial neural networks. They are constituted of several layers of artificial neurons and, when the network is trained, the connections between neurons are established in order to enable the system to make mostly correct predictions. So, in this example, as you can see, the trained network correctly recognises that the input pictures contain a cat.

In deep networks there are many layers and many complex connections, and the result is an increased performance, coupled also with an increased capacity of the system. AI systems can make predictions and possibly also take decisions accordingly, with or without human supervision.

So, for instance, in the medical domain they can detect the pathologies based on scans and suggest possible therapies. In the e-commerce domain, they can detect consumer preferences and suggest purchases, while, for instance, in the political domain, they can detect political attitudes and send targeted messages. If we consider appointments, they can predict future performance and suggest appointments or rejection. In the financial domain, they can predict, for instance, credit-worthiness and suggest granting or denying credit, and so on. So, AI is able to make better, cheaper and more predictions. Such capacities of course raise a number of issues in each of the domains that I have just mentioned.

The predictive capacities of AI also provide some benefits and, at the same time, they may raise serious issues. AI increases data collection, which for instance can be an issue for privacy and data protection. Other issues concern unemployment or a tendency towards monopolies and increased inequality. The use of AI may also result in unfairness and discrimination, as well as influence and the manipulation of individuals. Some authors also speak about a potential dystopic trends towards surveillance capitalism for instance, and the surveillance state.

So there is a need to maintain, for example, privacy and data protection as well as the lawful and proportionate processing of personal data and in order to control such processing. We also need to maintain fair treatment. We have an interest in not being subjected to unfair, differentiated treatment. There is also an interest in transparency, to know why a certain algorithm response or decision has been given. We have an interest in fair interactions, namely not to be misled or manipulated, as well as, for example, in fair competition. So here we have an interest in assessing the resources and algorithms that are available to big players.

A complex legal and ethical framework is involved, in particular with regard to human and fundamental rights. So here, for example, we need to take into account privacy, data protection, human dignity and autonomy, as well as freedom of expression, non-discrimination, equality and so on. There are also some social and economic goals and values that should be taken into account, such as welfare, competition, science, art and culture, compilation, democracy, civil dialogue and so on.

We have a number of legislative instruments that pertain to multiple legal regimes, each having its own legal principles, for instance, data protection law and principles like lawfulness, fairness and transparency, purpose limitation, data minimisation, accuracy, integrity, confidentiality and so on. We also have consumer protection law and principles such as, for example, the protection of consumers as weaker parties, regulated autonomy, non-discrimination and so on.

Regarding competition law, here we have principles such as those of fair competition, consumer welfare and so on. But many other domains of the law are also at stake since AI is affecting world society, such as, for example, contract law, labour law, administrative law and so on.

Before finishing my presentation, I would just like to mention that AI can also be used to protect and empower citizens. An example is the Claudette system. You can see its interface here. It is a system that automatically detects unfair clauses in consumer contracts and that can of course be used to empower and protect citizens. In the next slide you can see some references to our previous work for the European Parliament.

Finally, I would just like to thank you for your attention.

1-008-0000

Nicolas PETIT, *Professor and Chair in European Competition Law, European University Institute, Florence***.** – Members of Parliament, members of the Committee, I am very happy to be with you today. In my brief intervention, I would like to highlight two challenges requiring careful consideration from lawmakers, and I would also like to highlight one set of substantial problems, known as red lines, which require ambition from lawmakers like the European Parliament.

So let me start with the two challenges and move on with the red lines. The challenges that I want to talk about are not things that I have just made up. They are coming from the history of technology and what lawyers discuss when they look at how the policy-making structure tries to frame, control and influence technology evolution.

The first challenge is what I and my co-author at the University of Liège, Jérôme De Cooman, called the paradox of irrelevant legislation. It is extremely common for all of us involved in policy-making to speculate and, in a context of technological developments, we have incomplete comprehension of the technology capabilities, technology trajectories and the use cases.

Because lawmakers like the European Parliament need information to think about the risks and harms and opportunities, they often rely on imagined futures to generate facts, and often these imagined futures themselves are narratives that are built on either theoretical models coming from other fields of science, journalistic in their anecdotes, or even science fiction. As you know, I think one resolution of the European Parliament – or there was maybe a report a few years ago – started with a discussion of the three laws of robotics of Isaac Asimov, a famous American science fiction writer.

Now because science fiction is what it is or because futurism is what it is, lawyers, lawmakers and policy-makers often miss out on relevant technological evolution by focusing on the wrong ones, unfortunately. One example is self-driving cars. The dominant hypothesis in most futuristic works prior to the year 2000 was that, in 2015-2025, we would have men and women driving in flying cars, not driverless cars, which were really nowhere. If we had changed the law at that time, we would today have a detailed and useless law of flying cars.

The point that I want to make here is not to say that we should not regulate self-driving cars. Rather, the point is to ask whether we are making the right assumptions about the technology, its trajectories and its possibilities. For instance, in a self-driving system, it is pretty unclear today where the economic value will reside, whether it will be in the software, whether it will be in the engine, or whether it will be in the infrastructural frameworks, the roads that will be built to have these very special cars drive at the speed at which they can drive safely.

This in turn is a key question for any lawmaker or policy-maker who wants to create a liability framework to say who should be the bearer of liability and who should be the bearer of insurance, and whether this should be shared or exclusive. So this calls our attention to be extremely careful when we think about devising rules and legislation in environments of technological change.

To take a very clear example again, we spent a lot of time thinking about something called technological unemployment due to AI and robotics. A week ago, a company called OpenAI announced a new GPT-3 model called DALL·E that creates images from texts from a wide range of concepts and snippets found and expressed in natural language.

The news is interesting because the dominant hypothesis of technological unemployment work on which policy-makers have been working so far involves a replacement of jobs with very low creative skills.

So I think the upshot from what I say here for policy-making is that, firstly, we need a lot of investment in scenario planning capabilities to make correct assumptions about the future of technology; secondly, we need to keep options flexible as technology develops; and thirdly, it's probably better to adopt and create institutions that can control continuously, correct, and monitor and timely influence the developments of technology rather than adopt substantive legislation. Fourthly, I want to say that, as a member of the AI high-level expert group of the European Commission in the past, I was struck by the fact that we have so little information about the technology. Very little information.

This requires us to talk more with the private sector or the research organisations in the public sector that work on this technology. The problem for Europe is that, although a lot of work is done in Europe, there's even more work done in the USA and China.

The second challenge I want to talk about – very short – is that most lawmaking exercises assume that the technology is completely novel. There's an assumption of newness and, with this assumption of newness, very often there's a logical implication that the law has gaps or that we operate in an environment of lawlessness. There is not enough legislation. We need new law. We need to adopt specific AI law for instance. This is something that we hear a lot about. I think this is the wrong way to think about things and of course a lot of people have already talked about that.
But one example that I want to point out is that oftentimes the law is also in advance of the technology and this is much less talked about. So, for instance, in competition law, the law that we have on the books in the Treaties allows the European Commission and the other national agencies to actually control collusion without human communication, as well as direct price personalisation: each person paying a different price due to algorithmic control and surveillance.

So the laws that we have on the books allow the agencies to do that, but the agencies do not use them for various reasons. What we need there is not so much rewriting the rules, but maybe providing nudges and incentives for decision makers to revisit their practices and be more daring and ambitious in what they do with the existing law on the books.

I now want to go to the red lines and I'll close with that. This is my third remark. I started at 14.12 and I had ten minutes so I'll close in two minutes.

My third remark is a call for ambition. In some areas societies may choose to preserve their cultural and natural integrity by regulating, and perhaps sometimes even forbidding, some technology applications. You can think about direct genetic modification, you can think about transhumanism, you can think about organ markets or things like citizens carrying lethal autonomous weapons and other applications like artificial consciousness, anthropomorphic robots, moral agents on the line and super intelligences.

These problems are ambiguous creatures because they are neither short term, nor long term – we don't know – and they are neither real nor fictional. We don't know either. But in all cases they raise an existential consideration.

In my view, these problems are also political. They are genuinely political. They raise a political question because you operate in areas in which expertise, stakeholder participation and confrontation no longer yield clear answers.

This is where politics should step in and decide – democratic politics obviously. I just want to close on that note. I myself experienced a very weird set of challenges in relation to that question as a member of that working group a few years ago, where our ambition initially regarding AI was to define some red lines, meaning things that are non-negotiable, prohibitions, per se proscriptions. At the end of the line, by talking with other stakeholders, we didn't manage to agree on a list, but we didn't even manage to agree on calling them red lines. We called them 'critical concerns'.

So, with these remarks in mind, I want to thank you for offering an opportunity to talk at the European Parliament today and to tell you that the door is open for future collaboration if needed from your side.

1-009-0000

Giacomo CALZOLARI, *Professor of Economics, European University Institute, Florence***.** – Thank you, Members of Parliament, Members of the AIDA Committee, thanks for this kind invitation. I'm an economist at the European University Institute, I work on the industrial organisation, competition policy, but also work on financial markets, banks and, last but not least, of course, application of artificial intelligence in markets.

So, let me give you a snapshot of what I'm doing for my research. The world of artificial intelligence is vast and probably the most fascinating frontier for economic research and analysis. What I'm doing as research, I'm interested in observing how AI can bring efficiencies to our economies. You may know that economics as a science is termed the 'dismal science' because essentially we study how to allocate resources that are systematically scarce. In fact, artificial intelligence can help us a lot in doing this difficult allocation task, in helping our economies to perform this allocation task. What I've learned with my research is that, essentially, we really have to learn to cohabit in markets and in economies between humans but nowadays also humans and algorithms that are powered by artificial intelligence.

I will base my short presentation on two key ideas, which I think would be useful for the members of the committee as ideas that you can use across the topic that you are encountering in your works. The ideas are interactions and learning. So, let me start with interactions. Essentially, if you think about markets, in markets, we are never alone. We continuously interact between consumers and firms, between workers and firms, between firms as competitors, we interact as countries in the global economy. And so, the important novelty here is that now this type of interactions in markets are interactions that involve artificial intelligence

algorithms that are powered by artificial intelligence as well. And, this is a profound novelty for the economic scene that gives rise to many questions.

What happens to this economic interaction when some of the subjects have delegated their decisions, their choices, to AI algorithms? How algorithms perform when interacting with humans or when interacting with other algorithms within markets. And notice that we already have many of these types of interactions. Think about financial markets: many transactions, certainly most of the executions of activity in financial markets are performed nowadays already by algorithms and artificial intelligence-powered algorithms. But also think about mass-retail markets. Again, pricing algorithms are defusing in those markets and so again, we already have this type of interaction between algorithms and humans and between algorithms and other algorithms.

Now I come to my second key ingredient. The first one was interactions in markets, the second is learning. As my colleagues have illustrated before, the most dramatic novelty of the new version of artificial intelligence that we see nowadays is the ability to learn and actually to learn autonomously. And the most spectacular process of this learning activity you can probably see in this part of artificial intelligence that is called reinforcement learning. It's a class of algorithms that are designed to experiment, to explore the environment, to obtain feedback from the environment, which could be a market for example, and then to adapt. So, the big novelty here with respect to what is called the expert system is that the algorithm learns its way to behave in markets.

What is phenomenal perhaps of this reinforcement learning algorithm is that this learning can take place through what is called self-learning, that is learning generated by algorithms with no human intervention at all. You may have heard about this famous contest where AlphaGo was actually a famous algorithm that was able to beat the human champions of the game of Go. The strategies used by these algorithms were generated by interacting with other algorithms. To some extent these were strategies that have never been seen before on earth, because they are in a sense not humans.

Let me summarise. My two ingredients are interactions and learning. Essentially, what you have in markets is both elements at play together and to me as a researcher it is kind of mind-blowing really to think about markets populated by algorithms that have this ability. So, what I think is the take-home message from this is that we need a much better understanding of what is going on and this is why I love my job. So, let me summarise. We already have these artificial intelligence algorithms interacting in markets and autonomously learn to behave in ways that probably we haven't seen yet in markets. Is this good or bad?
Let me remind that my starting point is that artificial intelligence is bringing gigantic efficiency to markets for the wellbeing of all of us, but we also need to know whether things can go wrong, and this is actually the title of my presentation, which is: protecting consumers from high prices due to artificial intelligence, which is the title of one of my recent papers that has been published in Science. I just want to remark that Science is a hard-core academic journal that hardly publishes any work by social scientists. I want to remark here this fact because I think it's key at this point that hard science computer scientists interact in our understanding of the effects of artificial intelligence in markets with social scientists. This has been put forward also by my colleague here.

What we have discovered in this research, in this snapshot, is that algorithms that are designed to price products in markets quickly learn and will in fact learn to operate in this market and they solve one of the biggest issues of interaction, which is learning to cooperate. Cooperation in markets is very important, to generate, for example, efficiency in the use of natural resources. Cooperation can be good, but also can be bad because, for example, if you think about cooperation in pricing decisions, this actually can easily lead – and this is what we discovered

in our research – to algorithms that have autonomously learned to cooperate and set high prices. What was somehow astonishing in this research, in this discovery for us, was that this ability to cooperate that algorithms have independently learned, took place with absolutely no communications.

Cooperation, which in this case is termed in antitrust jargon 'collusion', is not new. We know that humans are able to collude but humans typically need to communicate in order to collude, so the algorithms that we have studied were able to interact, learn to cooperate and collude with no communication. This goes back to what I mentioned before; it's something that we haven't seen so far in markets. I think this is remarkable and what these discoveries are telling us is that we need to better understand how artificial intelligence may impact in markets.

Again, my starting point was that artificial intelligence is bringing efficiency. What I'm saying here is that we need to know more and we need collaboration between hard scientists, computer scientists and social scientists. For example, and this is useful for the problem for the example that was mentioned before, for what is called XAI, that is explainable AI. We need the ability to audit algorithms to understand what algorithms have autonomously learned and this type of work, interaction, between hard scientists and social scientists is actually something that we are very keen and very active on at the European University Institute.

The last comment that I want to make is another line of research that we are investigating is recommender systems. Recommender systems are algorithms that are designed to provide recommendations to individuals in markets. We already use and *(inaudible)* in the recommended systems when, for example, we choose, we are helped to choose products to buy between millions of possible products, stocks to invest in, songs to listen to, movies to watch. As consumers, to some extent as buyers, as investors, we are lost in this panoply of opportunities and possibilities. Recommender systems are algorithms that can really make our life easy, can recommend their products, the financial assets that better fit our needs, but at the same time, they certainly will have a dramatic impact on markets. Again, we will have efficiencies but we will also have something that we need to better understand.

It has been mentioned before the role of data. Recommender systems need to be fed with data, the more data you have the better the recommendation system will be and the more effective will be the recommendation to the actual user. But you see that this can create a cycle which is, on the one hand, a positive cycle because the recommendation becomes better and better, but on the other hand you may actually make competition between recommendation systems much more difficult if you don't have enough data to make your recommendations effective.

These are just two examples of the type of research that we are conducting at the UI and, if you want, my take-home message here for what I just said is we need to know and understand how artificial intelligence and the application of artificial intelligence through algorithms will affect markets through interactions – because, as I said, we are never alone in markets – and what these algorithms are actually learning.

The last point I want to emphasise again is the need for interdisciplinary studies and research and this idea of interdisciplinary research is one of the key dimensions of activities that we conduct at the European University Institute. Let me thank you for your attention and I will be very happy and ready to answer any of your questions.

Thank you.

1-010-0000

Edina Tóth (PPE), *Vice-Chair***.** – Thank you very much, professor, for your interesting presentation and the conclusions.

And with this I would now like to open the floor for the exchange of views with our Members. I have eight speakers on my list, and the format is the following: there are two minutes for the question and then three minutes for the reply from the experts. And if time permits, we can take maybe one or two additional questions. In this case just please write your question in the chat.

With this I would like to give the floor to the first Member of the European Parliament who will ask a question, who is Mr Riho Terras. Riho, the floor is yours.

1-011-0000
Riho Terras (PPE). – My question goes to Professor Petit. In your recent publication, *Models of Law and Regulation for Artificial Intelligence*, you have focused on four models which are used to regulate the field of artificial intelligence.

In this publication you have brought up three arguments against policy-implementing approaches of AI law and regulation. Firstly, regulations stifle AI innovation. Secondly, the interest groups capture regulations and, thirdly, the regulations cannot keep pace with technological progress.

I couldn't agree more and have expressed my concern several times that in making laws to regulate the artificial intelligence field we should keep in mind that this is a rapidly evolving area and we should not slow down this innovation by over-regulating the area of artificial intelligence. I'm glad that the European Parliament has paid extra attention to this field by creating this Special Committee on Artificial Intelligence in a Digital Age to explore this area more, and really do hope that this committee will become permanent, considering that this topic is arising more and more.

But going forward here is my question: how do you think we should regulate this field: should it be on the European level or should it be decided on the national levels? How much should we regulate so as not to inhibit innovation in artificial intelligence.

1-012-0000
Nicolas PETIT, *Professor and Chair in European Competition Law, European University Institute, Florence***.** – I really welcome this question, it's a really hard question and I'm bound to disappoint with my answer, but I'll try just give you a hint.

I think we need to separate two things here: two different types of exercise which require two different types of intervention levels. One is the regulatory exercise, which is, abstractly, this idea that we want to keep control of the technology. As I said in my remarks and as I think more and more about it, we need to build institutions and scenario-planning capabilities. To do that, we need information, and my principled belief is that the more institutions, the more decentralised the institutional framework is, the better we will understand the complexity of the technological change that is under the sun.

So I would tend to believe that in so far as regulation – meaning having institutional capabilities looking at how the technology evolves, monitoring and trying to understand – we need pluralistic and decentralised institutions, as Professor Larry Tribe from Harvard University said in the 1970s.

The second question, which is the question of investments and AI innovation: this requires clearly European-level intervention. There is not any doubt that today in 2021 the single market is not complete. And this creates lots of structural, regulatory, economic and, sometimes, cultural obstacles to the scaling and the learning and the sharing needed for these systems to develop at scale on par with US and Chinese technological capabilities.

1-013-0000
Maria-Manuel Leitão-Marques (S&D). – Thank you very much and thank you to all the speakers for that part of the session. It's very important to work on AI regulation with knowledge about how it is developed and used and this is a very interesting debate I would like to have with Professor Nicholas Petit about the right moment to regulate, but not only the right moment, considering the time we need to finish our regulation or *(inaudible)* European Institution. If we start today probably in 2 years, when we finish, technology will have changed a lot in our business *(inaudible).*

My question today focuses on consumer protection and is especially for Professor Calzolari. It's about how aware are consumers of the problem of how AI is currently raising prices? Will certification of AI price-setting algorithms help or is this inevitable? And how could AI be used by public entities *(inaudible)* those responsible for consumer protection and market surveillance to better protect consumers?

In Portugal we have a project that is being developed decoding legislation on consumer rights. It seeks to develop natural-language-processing algorithms that allow you to search for consumer-rights legislation *(inaudible)* in plain language. For example, imagine your flight gets cancelled; you can ask questions about it to the algorithm and you get simple answers, without technical language, that any consumer can understand. Are there other examples of such projects that you are aware of?

1-014-0000
Giacomo CALZOLARI, *Professor of Economics, European University Institute, Florence***.** – Thanks a lot for this very interesting question. Consumer protection is certainly one of the key elements of public intervention in markets, and this was the case long before the advent of artificial intelligence and algorithms. But certainly the presence of algorithms is generating new concerns.

So let me answer this question and several questions that have been asked by again stating up front that I'm very much convinced that these autonomous pricing algorithms are a source of efficiency for our markets, and it would be a mistake to decide to ban this type of algorithms. These algorithms are able to adapt to market conditions; markets are very difficult objects to handle, they are stochastic and subject to shocks, and algorithms may be able to catch changes in markets in a more precise and quicker way than humans. And this adaptation, this flexibility is valuable for all, not only for companies; it's also valuable for consumers.
So the first comment is: we should really avoid banning algorithms for markets because these are going to be a source of efficiency for all of us. This said, it is true – and I think I tried to make it clear that this is part of my own research – that something can go wrong. As was mentioned before, it may turn out that algorithms independently learn to collude and increase their prices. And of course this is to the detriment of consumers in the end.

So how do we address these issues? Whether preliminary certification of algorithms is a solution, I think, goes back to part of the previous question. My answer is no; preliminary certification is an almost impossible task because of the technology and the type of algorithms are evolving very quickly and no regulator would be able to follow these developments. This said, I think we can conceive of, and we have to start, working, together probably.

General principles. I think we can find general principles that can help consumers to avoid these possible negative effects, and let me just mention one general principle which is transparency or, as I was saying before, XAI: explainable AI.

We need transparency because we need to have the possibility to audit the algorithms, but if algorithms are black boxes then even if you are able to audit an algorithm and even if you are able to ask companies using this algorithm to show the content of that algorithm you wouldn't

be able to understand anything. That is one of the problems that we face in our research: we observed that activities were going on but we weren't able to understand them. So that is a problem of interpretability. This is an example of these general guiding principles that we may conceive of and start thinking to implement in possible regulations.

As to whether market surveillance can make use of artificial intelligence: absolutely yes, there are already applications of this idea, which I think are very important and very useful. For example, in another field of my work, banking regulation there is the development of what is called 'rag-tag' and 'sup-tag', which are the use of artificial intelligence and algorithms in the performance of all these complex activities of bank supervision and regulation. Also in anti-trust there are other applications that are called 'screens', which are tools monitoring markets precisely to identify possible issues of collusion between algorithms.

Thanks a lot for pointing out the project that you mentioned before. I think the project that my colleague Francesca alluded to in the first intervention showed that the ability to interpret the process of contact is going in that direction.

1-015-0000

Giovanni SARTOR, *Professor of Legal Informatics and Legal Theory, European University Institute, Florence***.** –Just a short comment, following what my colleagues said, there is already a law in this regard. We have a law on unfair commercial practices and we also have a law on unfair commercial contract terms. We also have to apply this law with regard to an AI system that engages in misleading or aggressive advertising, which happens quite often. You get those messages where you are invited to buy the last ticket that is going to disappear in a few seconds and a lot of pressure and anxiety is put on the buyer.

I would also like to point out one thing. First, we need to consider the specificities in which machines have learned how to engage in these practices because their goal is to increase sales or profits. It may happen that that they learn by themselves that misleading or cheating consumers is the best way to achieve that purpose.

Another point is that we can also develop AI systems that are used to protect consumers. As my colleague, Giacomo Calzolari, mentioned, we have also done something like that in this direction at the UI, where, in collaboration with computer scientists, we have developed a system that is able to detect unlawful contract terms in online contracts. We are also now developing and expanding the system towards privacy policies. So AI can also be a tool that is used by consumer organisations in order to detect unlawfulness and react to it in the competition domain, but also in the consumer domain.

1-016-0000

Karen Melchior (Renew). – Thank you very much and Happy New Year to everybody. Yes, I am in the room and feeling slightly lonely, but it's good to have you on the screens.

Thank you very much for the interesting presentations. I think it is really important that we look at how we want to regulate AI and that we do it well. The time for moving fast and breaking things is definitely over. What we want to do is to promote the good things of our society and not the bad things of our past.

So, when we're looking at, for example, the auditing of pricing algorithms, which was presented by Professor Calzolari, I would like to hear how we see when there is collusion when it happens without communication. Regarding the recommendations, how do we find out on what basis they are being made if it happens without communication? Also, how do algorithms actually learn when it happens without communication? For me, this is the big challenge and I would like to hear from any of the speakers, but especially Professor Calzolari, who spoke about this.

How do we make sure that we have the sufficient transparency, both on the data side on which the algorithms are trained, but also on the algorithms? How should we try to regulate this?

I understand that your work has been a lot on competition policy and pricing. You could say that this is actually the easy part because it is quite computable how this is happening, whereas if we're looking at, for example, the hiring of people and choosing which candidates to bring in and discrimination, then it becomes much more difficult to quantify what is going on. So recommendations of where we should be applying the requirements on the development of algorithms so that we open up what is often seen as a black box. Also, as you are all working in the research field, how do you recommend that we promote interdisciplinary research because we cannot have ethics and humanities standing aside and not being involved in the development of innovation for our future.

Thank you very much. I am looking forward to your answers.

1-017-0000

Giacomo CALZOLARI, *Professor of Economics, European University Institute, Florence***.** – As a researcher this is a fantastic question because it really goes to the heart of my research.

It is indeed challenging. We discovered these algorithms that were able to collude, that is to agree, to charge high prices, which is of course really bad for consumers and which is, by the way, very good for companies on the other hand. What is interesting here – and in fact we are collaborating with many scholars to understand what we should do here – is that the current status of anti-trust, mostly the practice of anti-trust and collusion, is that you can make collusion essentially unlawful whenever it is explicit, that is whenever we find hard evidence of managers in companies being able to agree and raise prices. So we need phone calls, emails and formal communication. Algorithms don't need all this and actually can do it on their own.

So in fact the difficulty for us was first looking at the algorithm, as I was saying, and trying to find patterns of behaviour. This is the key. In this specific example, the key for us is understanding the pattern of behaviour. We need to have the ability to learn, as researchers and also as regulators of the market, what are the patterns of behaviour that we do not want to find and observe in markets.

The type of collusion that algorithms were able to identify was in fact based on the pattern of behaviour that in the end we were able to discover and to unveil. As I said, this requires some adaptation. It probably doesn't require new anti-trust laws. It may require different practice and application of the law because we need to target some behaviour. I think this is key because we are talking about behaviour, as I mentioned in my introductory remarks. It may be behaviour that we haven't seen so far because it's generated autonomously by algorithms.

So I think this is one of the general principles that we mentioned before. We have to be able to look into the algorithms and understand what the behaviour is. Some of the behaviour can be very positive and effective for the functioning of markets. Some other behaviour we don't want to see.

It is not going to be an easy task an easy endeavour to move the regulation of markets from what we have, in a sense hard law, to this kind of soft analysis of the functioning of markets, but for me there is no way out of this deep and delicate part of the investigation. I fully agree with you that, to some extent, our first exercise on pricing algorithms was the easiest exercise to perform. There are many other environments where, for example, algorithmic discrimination may emerge in a much subtler way, and this is of course something that must be investigated.

If I may just add, it has been discussed in the previous interventions that probably Europe is, unfortunately, lagging behind in the technological developments of AI with respect to the rest of the world. But I think, as Europeans, we may have a strong advantage as soon as we start to think about, for example, the actual consequences of AI in markets at large in a general sense, and as soon as we realise that we need this type of sophisticated intervention in markets. Thanks a lot for this great question.

1-018-0000

Alessandra Basso (ID). – Madame Chair, dear colleagues, the use of pricing algorithms that discriminate against individual users is an extremely interesting issue that opens up a whole new set of considerations from an antitrust perspective.

There are two sides to this analysis. On the one hand, we have the consumers, who will be placed in a box according to their personal characteristics and then forced to pay a higher price. This is known as the reserve price. It reflects what each consumer is willing to pay, i.e. the maximum price at which a specific consumer would purchase a product or service. On the other hand, we have the competitors, who will eventually find themselves competing on a playing field dominated by just a few oligopolists.

In this game, the players most likely to succeed are those with the best pricing algorithms who, by extension, must also have the most data.

Thus, the significance of algorithms is linked to the availability of huge volumes of personal data that can be used to profile consumers. The combination of these two factors leads to damaging price discrimination to the detriment of certain consumers.

In view of this, I would like to ask Professor Calzolari whether it would be a good idea to manage the data in such a way as to ensure equal access to all market players, making sure, for example, that no one gains an unfair advantage, or else to restrict the data that operators can collect, even where consent has been given? And might it be helpful, in extreme cases, to apply traditional antitrust measures, because probably only antitrust measures that get back to basics and a regulation that is able to adapt quickly to these new digital dynamics will be able to recalibrate the digital markets and stop these competitive asymmetries that are damaging to consumers?

1-019-0000

Giacomo CALZOLARI, *Professor of Economics, European University Institute, Florence***.** – Thank you for these very interesting questions. Yes, I fully agree. What we are seeing, and some potential risks of what we are seeing, is a combination of algorithms and data availability. So let me go back to the second example that I briefly mentioned before: recommender systems. These are algorithms that, in some cases, in the most advanced cases, are powered by artificial intelligence that are designed to make recommendations. To make personalised recommendations to each of us as individuals, these recommendations are very powerful nowadays, very precise and they can spot interests that each one of us has independently and *(inaudible)* learned. For these you need good algorithms, but you also need a lot of data, a lot of good data, and here one of the problems is that those companies that will accumulate more and better data may have a strong advantage and, as I said, this advantage may reinvigorate because by having good data you have good recommendations, consumers, individuals are happy with the recommendations that you are giving them and then they're going to use your system more and more and this generates more data. That's the positive circle I was mentioning before.

But notice again that this is not bad per se, it is providing better and better recommendations and, as users of recommender systems, as consumers, as investors, we are happy with that

because we can put our money in the best assets that suit our needs the best. So, this is certainly positive.

What the problem there is that this type of mechanism may actually, as we say in antitrust jargon, tip markets and may generate winners take all kind of results. We know that the Commission has a proposal on digital markets in this direction, I think it's important, but, if you want my opinion, restricting the collection of data is – of course, provided that all privacy rules are satisfied, all privacy laws are satisfied – restriction in the collection of data is not in my opinion the good solution. What is important, though, is having the possibility to keep the competition in this type of markets, markets that are based on algorithms and, for example, recommendations, open. So, keep the competition open rather than restricting the amount of data that are collected which, per se, may actually deteriorate the quality and the efficiency of these algorithms, we may actually think about sharing the data, opening the data. Of course, this is a delicate matter, I'm fully aware that it requires proper handling of all sorts of rights but this to me is probably the way to go.

1-020-0000
Damian Boeselager (Verts/ALE). – Thank you very much to all the experts for your expertise. It has been quite insightful to listen to what you've been saying, to your answers.

I also have a question to Professor Calzolari in regards to collusion and oligopoly. I am very much interested in fair competition and what you've been saying about pricing competition, but I was wondering, because a lot of your analysis seems to be centred around trying to identify actual collusive practices, so when collusion actually takes place. I was just wondering whether you have also tried to understand how to fight oligopolies already when they exist in a certain market segment, and so in this case also when it comes to the AI markets. And to make it more precise, we can already see that in cloud storage or data storage markets we have an oligopoly which doesn't yet translate into high prices and potential collusion but might at some point, and I fear that this kind of oligopoly in the data market could also transfer itself into the AI market at some point.
So, do you see this danger as well? And, in general, what do you think we can do to fight the market concentration as we currently see in the data market to ensure that it doesn't happen also in the AI markets from a regulator's perspective?

1-021-0000
Giacomo CALZOLARI, *Professor of Economics, European University Institute, Florence***.** – Thank you for another great question. Sure, we have to really pay attention with concentrated markets but concentrated markets are not bad per se. Concentrated markets can be very efficient in the end, under certain conditions of course.

So, when firms compete for similar products for example, fewer firms competing may actually deliver a very competitive outcome and so, in our abstract models, this is the model that economists use to represent actual economies. We can show that two firms are enough perhaps, under the same conditions, to generate a very competitive environment and two firms in the market would be considered to be a very concentrated and oligopolistic environment, but I'm absolutely with you with the idea that whenever there is this type of concentration, and what I would say even more so whenever we observe strong barriers to entry, we have to be vigilant and, as was mentioned before actually, algorithms based on artificial intelligence can be used to screen markets, to screen the type of behaviour - that was mentioned before - that we do not want to see on markets. So, this requires a changing paradigm in the way we handle collusion on markets, because, as was mentioned before, to find collusion you need hard evidence and normally an observed pattern in pricing is not considered enough to claim that a collusive agreement is in place.

I think this is probably something that we have to rethink a little bit and certainly pricing patterns may be a strong indication that something is happening. And as I said, artificial intelligence can help antitrust authorities to monitor markets on a much larger scale with respect to what has been done before, because this can be automatised through algorithms scanning the pricing behaviour of markets. This is not going to be an easy task, but is simply something that we can leverage and can rely on, thanks to these algorithms and their development.

Just to conclude, to some extent, the fact that markets that really rely on data will be concentrated is somehow a natural necessity of the technologies that we are talking about, since these are technologies that require large masses of data. These are technologies that rely very often on networks of technologies and all this stuff works well when we have a lot of people working altogether, using the same platforms for example.

So, to summarise, I wouldn't see oligopolies as necessarily something that is bad. They are something that some markets need to monitor probably more frequently than in the past.

1-022-0000
Nicolas PETIT, *Professor and Chair in European Competition Law, European University Institute, Florence***.** – My other activity besides following AI is to teach competition law, so that's actually my first activity and the invitation of my colleague Professor Calzolari to look into collusion with different eyes and under the law is extremely important and points to listen to and act upon by decision makers.

So, I would like to follow up on that and say two things because there is often the impression in the emerging literature on algorithmic collusion - which can take place, as Professor Calzolari has highlighted in his research and is becoming a clear concern - that the law that we have doesn't allow competent agencies like the European Commission to do anything. In the legal field, we've spent maybe 50 or more years discussing the possibility of applying the law of abuse of dominance, and in particular of abuse of collective dominance, to collusive outcomes, not collusive processes. So, when you see that prices are flat in the market and that there's an oligopoly which remains a condition for this algorithmic collusion to take place – you can't collude if you're just one – we can apply views of collective dominance in markets in which you see collusive outcomes not collusive processes. So, you might not have communication, but you see the prices are flat, they are stable.

And the problem, of course, is that the agencies have not really looked into that really, they're focused on cartel investigations, emails, phone calls, SMS and WhatsApp messages but I think it is now about time – on the invitation of my colleague and the research of serious economists will tell us there is something here, there's no communication but there is collusive pricing – that we look into that again and that we look at applying Article 102 on national equivalence to collusive outcomes. I have myself written a short paper about that for the FTC, the Federal Trade Commission in the United States hearings last year. I would be happy to share that with the group and other literature.

The second thing I want to say is, besides *(inaudible)* enforcement, of course, we should not underestimate markets, as Professor Calzolari also said, and one area of thinking is to think about markets, middleware markets, where consumers would be benefiting from technological solutions to actually undermine the working of algorithms on the selling side. So there is technology emerging to protect consumers. One real question and a hard question for investors and lawmakers trying to facilitate investment is whether we should enable consumers to avail themselves of middleware technology that puts a screen between the bad selling algorithms and the individual consumers. There are some solutions, some applications have been developed, but much more work is needed in that field and thinking.

1-023-0000

Adam Bielan (ECR). – Good afternoon, Happy New Year to everyone. First of all, I would like to thank all the experts for their interventions and presentations. My attention is mainly drawn to you, Mr Sartor, and to your recent publication on the impact of algorithms for online content and filtering moderation. I think we all agree that there is a tendency to claim that algorithms are necessary to filter and flag illegal content effectively. Certainly we have seen too many challenges faced by private and public actors to ignore this aspect. In this context, to what extent do you consider algorithms to be a threat? Will the obligation to disclose how an algorithm works make it easier to abuse them by, say, the actors? What would be your main recommendations to ensure the protection of citizen-driven democracy and all of what it entails – anonymity, freedom of speech for respect of opinions and of artistic publications and, of course, equal treatment of users and consumers? For that matter, how should the DCA complement or be complemented by already-existing regulations at EU level such as GDPR so that we avoid duplication of similar requirements across different legislations?

1-024-0000

Giovanni SARTOR, *Professor of Legal Informatics and Legal Theory, European University Institute, Florence***.** – Thank you very much for this great question that raises so many issues. Let me first say that I believe that online moderation by the platform is a necessity. There is no other way unless platforms ensure that we are able to have an acceptable behaviour online and to avoid those kinds of issues that we are now seeing in the United States and elsewhere. The issue is that, if online moderation is needed that is filtering out or removing messages that are unlawful, that express hate, that are in any way against the law, algorithms are needed for this purpose. It's the sheer amount of messages that makes manual controls impossible.

What is needed, I believe, is the ability to control and challenge the way in which these algorithms work. These algorithms are based on artificial intelligence, and so we have the issue of opacity that was raised before – but I believe that this is not insurmountable. People uploading messages may see their messages being excluded or downgraded, but they should have the possibility to appeal against such decisions. This should be a right that should be enforceable against a platform: to have, possibly, a human decision and also to have an appeal to a public and legal institution that will have to decide. Obviously there is a range of space for each platform to decide its own policy with regard to what is acceptable but in such a way as to respect the users' freedom.

I won't go into the issue of data protection because this raises a whole set of issues concerning the way in which platforms use the data uploaded by their users. In this regard I would say that we can rely on the General Data Protection Regulation. It provides, from my perspective, an adequate discipline without the need to intervene too much. There are some open issues such as the issue of explanation that is connected to the automatic decisions such as a decision to exclude a person or a content from a platform, but in general I believe that, as far as data protection is concerned, the GDPR is generally providing an adequate solution.

1-025-0000

Pernando Barrena Arza (The Left). – Good evening everybody. I will go straight to the point and put a question to Professor Nicolas Petit. A recent study on artificial intelligence by the German Bundestag supported a risk-based approach as regards the requirements on the necessary *(inaudible)* for each category of artificial intelligence system but insisted on the necessity to have more than two categories – high-risk and low-risk applications – to properly address the challenges and potential risks that new artificial intelligence applications can imply. Our Group shares the view that there is a multiplicity of situations that can be appropriately addressed with a dual classification and that more tailored categories are needed. Are there existing examples of such approaches in existing legislation, and if not, what would you suggest to the union legislator to ensure that the upcoming legislation properly covers all possible

situations and risks? Thanks in advance, and thanks also to all the speakers for their interesting contributions.

1-026-0000

Nicolas PETIT, *Professor and Chair in European Competition Law, European University Institute, Florence***.** – Thanks for the great question – this is actually a question that will keep me busy in the next weeks, as I'm teaching a course here on law and technology, and we will focus on risk regulation. What I can tell you, with my limited knowledge at this stage, is that finer classifications – ones that go beyond binary low / high-risk classifications – have been proposed and may be implemented in relation to nanotechnologies in the past. So more risk scenarios than just two. There has been support in the academic literature for more fine-grained risk classifications. So I think there's more sophistication that can be reached in relation to risk regulation than low / high-risk categories. They provide a good start, but of course you can go deeper. That's all I can tell you – I'm sorry.

1-027-0000

Maria-Manuel Leitão-Marques (S&D). – Just one more question to Professor Nicholas Petit about this problem I spoke about: how to change – it's not exactly *(inaudible)* it suggests me – how to change the way you will regulate in order to have more flexible regulation that could be adapted to the changing technology? For instance, when we think about the *(inaudible)* – we are having this discussion in the Parliament. We are going to finish in two years maybe – I'm an optimist; I hope less, the but it's a tradition in the Parliament that negotiation will *(inaudible)* the Commission, and *(inaudible)* platforms are going to be very different than today. So what can you suggest we need to think in order to do it faster, or to do it in a different way so that the regulation can updated more easily?

1-028-0000

Nicolas PETIT, *Professor and Chair in European Competition Law, European University Institute, Florence***.** – That's a great question, and frankly, I think a ton of lawyers around are grappling with the same issue. I have, I think, two practical recommendations to make here – very concrete ones. One is we might try to allow decision-makers to start regulatory experiments in circumscribed areas of the territory on population. That is, we may try to run tests or experiments of regulation in contained environments where we have created sufficient controls to avert catastrophic risks. And if this is an experiment, because this is an experiment that is controlled and monitored, we don't necessarily need to meet all the legal requirements, procedural and substantive, that are needed to pass legislation. So that would allow us to get a sense more quickly about what needs to be done without entering into the complexities of passing legislation or passing regulation. So I think we need to think really hard. It's been done in many areas of our legal systems, but this idea of trying to experiment with one company, with one community, with one region, with one city, with one neighbourhood – I don't know, but these are... So, we change the unit of analysis, we create a controlled environment, and we test. So that's one.

The other thing that's – and so in Japan they've done that: I think there's this concept of *(inaudible)*. But you know, this needs to be done carefully so more research is needed, but this might be a vision for more *(inaudible)* regulation.

The other one, which sometimes is looked at as anathema by the private sector – but I think there is more to it, especially as we are having this discussion about the corporate social responsibility of private sector organisations – would be to create panels within companies representing public institutions, and they would be there and summoned sometimes to discuss with the technology companies about their *(inaudible)* accountability mechanism built in the corporation. Of course, you know, this has to be thought out carefully, but this would also be interesting – trying to create a bridge for a more continuous dialogue with the private sector about what the research is about, what the capabilities really are, without having the sort of

command-and-control, heavy-handed regulation which is not necessarily a good thing for investments and innovation.

1-029-0000
Giovanni SARTOR, *Professor of Legal Informatics and Legal Theory, European University Institute, Florence***.** – I would just like to follow up on what my colleague Nicolas just said. I have been studying recently both the situation in the data protection domain and in the monitoring on online platform, and I think that in another protection domain there is an interesting model. The data protection authorities are doing, I think, a good job in identifying and reacting to problems, and also there is the previous Article 29 Working Group and now is the Data Protection Board that are doing, I think, a great job with their opinions, which are very good in providing guidance, I think, to controllers and generally to what is happening in companies. On the other hand, there is nothing like that in the domain of online platforms, and you see the problems that emerge. So it seems to me that the data protection domain could be a good example of practice with aspects that may be possibly transferred also elsewhere. I don't know if my colleagues agree, but this is my view.

1-030-0000
Nicolas PETIT, *Professor and Chair in European Competition Law, European University Institute, Florence***.** – On behalf of my colleagues, Professor Sartor, Calzolari as well as the EUI, I would like to thank the European Parliament for allowing us an opportunity to discuss these important issues with you. I also want to remind the Members of the European Parliament that the EUI is home to the European Union interest in research, and we will welcome you as soon as you want and whenever you want to discuss these issues. So we have an open-door policy and we are extremely able and willing to engage in more discussion with you on these subjects of paramount importance. So that's all I wanted to say, and thank you again for the opportunity.

1-031-0000
Giacomo CALZOLARI, *Professor of Economics, European University Institute, Florence***.** – I just wanted to make two final remarks. We have discussed a lot about data, so there's this topic where it came about several times on different dimensions, and I would like just to mention another group of data, which I think lawmakers should really have on their minds, referring to data generated by machines. So far there has been a lot of discussion and fantastic regulations on personal data and data generated by activities and on individuals – on humans. Now there is an entire new world of data that are generated by machines. And these data have the power of being very effective, again when factored into artificial intelligence. I would just like to mention this very important dimension for the future. And my last point: I would like to follow up what Nicolas just said. As you have seen, we are very active at the European University Institute with this type of interdisciplinary research that we think is going to be key to understanding the impact of artificial intelligence on our lives, and I just want to mention that in fact we have a cluster group that is called the technology cluster, which is following a very important research agenda we think: it's about the impact of technologies on societies. And with this I really thank you for having us today and hope to have the opportunity to talk with you soon.

1-032-0000
Axel Voss (PPE), *rapporteur***.** – Thank you, Edina, and special thanks to our guest speakers, who have offered such impressive accounts of what AI can do and the potential it holds, but have also shown us just how complex it is, which explains why it is a challenging topic for legislators.

We have heard that there are great efficiency gains to be had – for businesses and individuals alike. Yet we are increasingly being asked to weigh these gains against other considerations. That means weighing privacy and security concerns, for example, against innovation, or considering the relative importance of legal and social values. All our speakers have so impressively made the point that we should also always bear consumer protection and

empowerment in mind, and that AI can even help us in this regard. Of course, we often talk about whether decisions are justified, and the point at which our ideas about safeguards – and this has already been mentioned – need to turn into clear red lines.

This raises many questions from a legislator's perspective, and it is often then difficult to come up with the right answers. For example, on the topic of price fixing, we have to recognise not only that common prices may either come about by chance or be set deliberately, but also that it can be difficult in a system governed by the rule of law to prove collusion, especially when it comes to individual consumers. Academics and experts will understand this perfectly; but how will it go down with individual consumers on the receiving end?

Another question also came up: do we really need to legislate every time a new issue or new development emerges? Or should we not simply tweak the old ones a bit? The latter approach is the one we seem to have settled on.

And then at the end – as indeed throughout the discussions – the issue of data and data quality was raised again. Here too we should of course say that if we want AI to work for us, we, as legislators, should in fact also endeavour to ensure that the data needed to develop AI in Europe is available, and quality data, which tells us that data restrictions do not always make sense.

This also makes me wonder whether the principles in the General Data Protection Regulation – the GDPR – and the techniques described therein are sufficient, or whether some of them might not already be obsolete and whether we shouldn't, through the use of certain techniques or options, perhaps somehow make it possible to collect more data, even personal data, without ultimately abandoning data protection or the protection of privacy. We should perhaps also reflect on how to go about making such data available without infringing fundamental rights. Balancing acts of this kind are always tricky, but essential in my view.

Thank you for your invaluable insights, and I look forward to further exchanges in future – perhaps in the context of the report.

1-033-0000

Giovanni SARTOR, *Professor of Legal Informatics and Legal Theory, European University Institute, Florence***.** – Thank you very much but nothing important. I just wanted to thank you for this opportunity and I hope we will continue in our exchange of ideas. There are many other interesting issues that are related to AI that I would like to discuss with you. One issue that was mentioned: this issue of explanation, which is central. Another issue is the issue of fairness, and there is a lot of need for interdisciplinary discussion on, for instance, how to develop a concept of fairness that is appropriate to AI systems. There is already a lot of work in computer science that we should bring into the social sciences and also into policy-making. Thank you very much again – it was great to be with you today.

1-034-0000

Edina Tóth (PPE), *Vice-Chair***.** – And with this I would like to thank all our panellists and Members today for the very interesting and enriching discussion and I'm confident that our committee has gained many helpful insights today to guide our work in the next months on artificial intelligence and, with this, I would like to close the meeting. Thank you to all of you especially to our panellists and have a nice evening and see you at the next meeting.

(The hearing closed at 15.45)