

Inauguration Speech
Challenges for Europe:
Sustainable Innovation and Human Rights

Prof. Dr. Klaus Mainzer
President

Excellencies, dear members of the European Academy of Sciences and Arts, Ladies and Gentlemen

I am very happy to welcome you physically to the great auditorium of the University of Salzburg. It is true that the Presidium and Senate have been in office for almost two years. But because of the pandemic, the dates had to be postponed again and again. This is also the case with this inauguration speech as President of the European Academy of Sciences and Arts. The theme of my inauguration speech is

Sustainable Innovation and Human Rights - Challenges for Europe.

This theme is also the motto of my presidency.

Tradition and new beginnings

As you know, our Academy has a great tradition. It was founded in 1990 by Franz Cardinal König†, the spiritual bridge builder at that time between East and West, Nikolaus Prince Lobkowitz†, with his noble family a representative of the old Christian Europe, political philosopher, President of Ludwig Maximilian University in Munich and later of the Catholic University of Eichstätt and - last but not least - Felix Unger, heart surgeon and professor in Salzburg, organiser and motor of the Academy until 2020.

The founding phase of the Academy in 1990 was a time of European awakening. After the dissolution of the Eastern Bloc, a new era of understanding seemed to be dawning, in which the ideological ghosts of the 20th century seemed to be gradually overcome. After 1990, landmark meetings with international politicians, scientists and artists took place at the Academy. These events in the period from 1990 to 2020 are documented in the commemorative publication "30 Years European Academy of Sciences and Arts", which was presented at the Academy in May 2022.

After 2020, there are signs of a new global upheaval, characterised by two drastic events. First, there is the pandemic with far-reaching social, economic, cultural and academic consequences. Thus, with the start of the new presidency at the end of 2020, we were forced to hold almost all meetings, workshops and conferences online.

The second drastic event was 24 February this year, when the troops of the Russian Federation attacked a sovereign European state like Ukraine and broke international law. This war in Europe has serious world political, military, economic, cultural and academic consequences that cannot yet be foreseen. Europe has been thrown back before 1990 and the ideological ghosts of the 20th and 19th centuries seem to have risen again.

As far as the pandemic is concerned, however, the online events brought us together with our members in European and non-European countries in a way that was hardly ever done before. These numerous events are compiled in the first Annual Report 2021 of the new Presidency. All these activities would not have been possible without the dedicated support of the members of the Presidium and Senate, to whom I would like to express my sincere thanks at this point.

"We are a working academy!"

This brings me to a central demand of the Academy: we want to be a working Academy in the future and not just an assembly of honourable and deserving (mostly older) members. What is our offer as an academy to younger academics doing research in highly specialised disciplines? Our Academy classes in the humanities, medicine, art, natural sciences, economics, law, social sciences, environmental and technical sciences and world religions open up a unique opportunity for interdisciplinary networking of experience and creativity with current cutting-edge research.

As I already emphasised at the previous General Assembly, in addition to connecting the generations, we must also support the greater involvement of women. This does not only mean more nominations of female members. The Academy also thrives on the willingness to engage in the various tasks and initiatives.

For this reason, last year the Senate set up three interdisciplinary expert groups on classes dealing with central challenges facing Europe. The first expert group deals with "Digitalisation, Artificial Intelligence and Societal Impact" and the second expert group with "Environment, Climate and Energy". Digitalisation and energy technology with a view to climate and environment are two central challenges facing Europe. A third expert group was to deal with the policy and organisation of "Research, Innovation and Education". These three expert groups met yesterday and today, so that the Academy members could inform themselves about the results of these groups so far.

The aim of these working groups is to produce white papers with results and recommendations in order to document the Academy's profile and expertise and to cooperate with other European research institutions on this basis. For this purpose, these documents must be published. For this reason, the Senate decided last year to establish a journal of the Academy, which is now starting its work with an Editorial Board elected by the Senate. The structure of the journal and its publication guidelines are posted online. All members of the Academy are welcome to publish.

However, it is not only about long-term research, which will later be expanded to include other expert groups in the humanities, arts and world religions. The Academy also responds directly to current events. This is demonstrated by our statement on the Corona Pandemic 2021, which was documented in several languages on the website and discussed in the media. This year, we added our statement on the war in Ukraine.

Complex systems modelling and the anthropocene

Behind the topics of the expert groups is a central challenge for Europe and the world: How should we manage the dramatic and chaotic dynamics in a complex global world?

I have been working on the mathematical modelling of complex dynamic systems in nature and society for many years. A typical property of complex systems is that local events can trigger global effects that can make the entire system chaotic, uncontrollable and unpredictable. Examples are fires in the Amazon jungle that affect the climate globally. Another example is the local traffic density of our cities, which builds up to global pollution of the atmosphere. The local pandemic outbreaks in individual countries lead to the disruption of global supply chains. The local war in Ukraine leads to global political, military, economic and social crises.

The largest complex system is the Earth system itself, which is no longer influenced only by natural causes such as water, climate and biodiversity. Added to this today are almost all the factors of human civilisation, such as population growth and economic growth, which are causally fed back to the natural factors. This creates a complex dynamic system whose elements interact mathematically according to non-linear equations. Such systems are highly sensitive to local disturbances that can lead to global chaos if critical values of control parameters are exceeded - as in the case of the climate crisis. This complex Earth system with its human influences was called the Anthropocene by Paul Crutzen.

Digitalisation, AI and Societal Impact

How can the billions of data be taken into account in these complex models? It would not be possible without digitisation and powerful computers. Likewise, global communication, supply and delivery chains of humanity require digitalisation. It is the nervous system of our Earth system and of human civilisation. The founding of the European Academy in the 1990s coincides with the spread of the internet. Today, not only people communicate on the basis of a worldwide computer network. Today, "things" are equipped with sensors to communicate via codes. We speak of the "internet of things".

Examples are our smartphones, whose permanent sounds and signals bear witness to this more or less independent communication. In smart mobility, cars also exchange signals independently and are on the way to autonomous driving. Without this autonomous exchange of signals, today's air traffic would not be possible. Smart houses, for example, already regulate their energy balance and lighting more or less by themselves. The next step will be to digitise and automate the infrastructures of cities. In Europe, the Baltic States and Ukraine (!) have a high level of digitalisation.

As coordinator of the Expert Group on Digitalisation and Artificial Intelligence, I have highlighted the Industrial Internet (Industry 4.0) as central to the European economy. Here, the Internet of Things is applied to the industrial and working world: Workpiece and workbench, robots and conveyor belts are equipped with sensors to regulate their interactions autonomously through signal exchange. So not only human-to-human and

human-to-machine communication, but also machine-to-machine communication. Not only the industrial and working world, but also our health systems would no longer be possible today without digitalisation. Artificial intelligence opens up new possibilities for medical diagnosis, therapy and surgery.

However, the potential of supercomputers and global digital networking are also associated with a "dark side of power". The nightmare of global digitalisation and AI would be total control of society if this potential were combined with authoritarian concentrations of power. As an example, the expert group discussed the "Social Score" programme in China. A "digital twin" is created of every citizen of the People's Republic, in which all data, statements and behaviours are recorded. With machine learning, intentions of individual citizens can already be read from the statistical data correlation. This is almost mind reading by AI. This would bring us to the world of Orwell and Big Brother.

An important finding of our working groups is that digitalisation and AI are closely linked to the energy issue and thus environmental and climate issues. Digitisation and AI consume enormous amounts of energy, on the scale of countries' households. But energy consumption means environmental and climate pollution. Anyone who has ever seen the heat and steam generated by a supercomputer will clearly understand what we are talking about.

Environment, Climate, and Energy

Our demand is that digitisation should begin with the decarbonisation of energy. This includes above all renewable energies such as solar and wind energy, but also alternative fuels. In the expert group "Environment, Climate, and Energy", hydrogen was highlighted as a central bridging technology, but detailed studies on nuclear and fusion energy were also presented. Only sustainable energy enables a circular economy that protects the environment and the climate.

In the end, we recommend an energy portfolio that can react flexibly and resiliently to changing crises. As in a stock portfolio, one-sided fixations are dangerous, as the current dependence on Russian gas shows. Like shares, future technologies are bets on the future. That is why I speak of an innovation portfolio that must be constantly renewed and adapted with a view to changing circumstances.

With regard to climate and environment, digitalisation and energy consumption must be sustainable. The energy consumption of biological ("natural") brains is incomparably more efficient than digital computers. That is why I am on the advisory board of a future cluster of the Federal Ministry of Research and Education (BMBF) in Germany that is working on neurocomputing as an alternative computer technology modelled on the brain. Last year, we organised a conference at the European Academy on quantum computing and quantum communication as another more energy-efficient computing technology.

Sustainable innovation and the UN-sustainability development goals

The example of digitalisation makes it clear that in the end it has to be about sustainable innovation for Europe. Sustainable innovation must integrate the Sustainability Development Goals (SDGs) of the United Nations (UN) into technologies and societal infrastructures. However, the 17 points of the UN Sustainable Development Goals do not stand next to each other like isolated blocks, but are interconnected and interdependent like the factors in the Earth system. This can be illustrated by the examples of pandemic and war:

The pandemic first concerns SDG 3 ("Good Health and Well Being"). This is not only about physical well-being. The pandemic with its isolation measures shows how much mental health is affected. This was the subject of an EASA workshop this week. Some members of the Academy intend to found a European Centre of Mental Health with the ERC (European Research Council). The pandemic also affected SDG 4 ("Quality Education"), as home schooling overburdened pupils and students in some grades and led to learning deficits. In addition, the pandemic significantly affected SDG 8 ("Decent Work and Economic Growth").

The war in Ukraine initially affects SDG 16 ("Peace, Justice and Strong Institutions"). Typical for global feedback in the complex Earth system is the impact on SDG 2 ("Zero Hunger"): As Ukraine is one of the world's granaries, the war with its systematic destruction of livelihoods and supply chains by the aggressor triggers famines in other parts of the world such as Africa. But SDG 1 ("No Poverty") is also affected: Impoverishment threatens not only in poorer continents, but also in the long run in large parts of the population in rich Europe.

A positive effect of the war could affect SDG 9 ("Industry, Innovation, and Infrastructure"): Europe is forced to become independent of fossil energies as quickly as possible and to accelerate the development of sustainable innovations. SDG 7 ("Clean Energy") would also be positively affected. A positive effect is also seen for SDG 17 ("Partnerships for the Goals") with respect to the EU, because an external aggressor lets grow together the attacked community.

The terrible thing about this war, however, is that Europe is being bombed back to the time of World War 1 and 2 with artillery and tank battles by an aggressor. But we live in the 21st century: Actually, humanity has other problems to solve with the climate catastrophe than to dwell on local nationalist conflicts in the style of the 19th and 20th centuries. We must return to the "path of virtue" of sustainable innovation as quickly as possible to ensure the survival of humanity and this planet before it is too late. Nature cannot be negotiated with. When critical values of the control parameters of complex systems are exceeded, global systems run irreversibly into disaster. Therefore, the energetic help of all countries on this earth is needed, especially the countries with the greatest expansion such as the United States of America, Russia and China.

Tasks and Requests for the European Academy of Sciences and Arts in Challenging Times

What can Europe learn from these crises? What are the challenges for the European Academy of Sciences and Arts?

Europe is in a fierce competition with the world powers.

Therefore

- to preserve its independence and prosperity in the long term, it needs sustainable innovation and science through the creativity of its citizens.
- at the same time, however, we must create an attractive model of civil society with democratic division and control of power („checks and balances“), protection of human rights and international law. These fundamental rights and duties have been the basis of democratic constitutions.

The European Academy of Sciences and Arts feels committed to this and therefore demands that its international members take an oath to stand up for these rights and duties. The General Assembly decided on such an oath as extension of our by.laws.

With sustainable innovation and human rights, the European Academy of Sciences and Arts has a clear compass for its work in uncertain and challenging times. And, please, don't forget we are a working academy and live from the engagement of our members.

I thank you for your attention.

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