



Welcome and Opening

Key points taken from the opening intervention of Dr Paul Rübzig's (MEP, EPP, Chair of the Science and Technology Options Panel) speech:

- The European Parliament is not just a legislative institution; it is a post-graduate learning institution. Today's event highlights this once more.
- We need more funding in scientific research since research is the foundation of our thinking.
- ESPAS is about breaking up silos, which is important. ESPAS is equally important for decision makers and analysts. It is about strengths, weaknesses and opportunities but also threats from within our Member States, the neighbourhood and the wider world. Thinking about the future will make a difference, because we might create resilience.
- Some say that the refugee crisis would have been dealt with more swiftly if foresight had been considered. But every problem is also a big opportunity for the EU as we learn and improve in organising and connecting our various think tanks better.
- In STOA we work on today's issues on an everyday basis to create networks of thinkers and doers: not to find solutions, but to create options. In foresight it is important that we do this correctly, scientifically backed and horizontally connected. Therefore, I always ask: "*how are you connected to all our other activities, Horizon 2020, the agencies, do you have connectors, how can we communicate results together?*" when I visit one of our research institutes. STOA needs to be connected to the world of think tanks and academia to become a hub for the European Parliament. Currently we are linking researchers and MEPs in order to learn from one another.
- The armchair discussion format of today's ESPAS conference is a good way to advance our understanding together.

Summary Future Science Panel: The World in 2030

How far will science have progressed by 2030 in fields such as genetics and robotics, and will societies globally and in Europe be able to shape developments and prevent possible excesses? Will a scientific renaissance lead to a revitalised and more humane society? Or will the negative consequences of these advances prevail, in an age when anyone might print weapons of mass destruction?

On the second day of the ESPAS Conference 2015 at the European Parliament, **Mady Delvaux-Stehres**, (MEP, S&D), Member of the STOA panel and Rapporteur for the EP Committee on Legal Affairs working group on robotics and artificial intelligence, discussed these and other issues with **Dr Jean-Jacques Cassiman**, emeritus Human Genetics Professor at KU Leuven, **Dr Geneviève Ferone Creuzet**, a corporate social responsibility expert and author of 'Bienvenue en transhumanie', **Dr Sabine Hauert**, a Swarm Engineer at the University of Bristol and co-founder of Robohub, and **Dr Ana Noronha**, the Executive Director at Ciência Viva, Portugal.

Ms. Delvaux-Stehres – wavering, as she said, between hope and fear about scientific progress – started off by posing some questions to the panel: Will science eventually win the battle against illness and will humans be immortal and forever young? Who will have access to progress? Will a happy few, super-intelligent, and super-powerful, dominate the world? How can we react as Europeans, as a community of values, to rapid changes in genetics and robotics?

Genetics

For **Professor Cassiman** these are exciting times in DNA research. Much can be done, especially by using new technologies. But how will we manage this knowledge revolution encompassing all sectors of medicine? Today, the implementation of new technology in genetics advances so fast that validation is sidelined. Things that possibly have not been completely thought through are tested in clinics. Therefore, one should also ask where the endpoint of this development is. Here **Professor Cassiman** pointed to transhumanism as one possible future and appreciated that this issue would be included in a later discussion.

Another important topic is the balance between academia and industry, since it is now possible to order all sorts of DNA analysis via the internet. Will academia finally have to admit defeat? What is to be done when DNA testing quality becomes so cheap and efficient that people know about diseases well in advance, but simultaneously treatment becomes unaffordable? Accessibility is a common problem in all fields of medicine, not only in genetics, but also in nano-medicine and neuro-enhancement.

To conclude, modifying the environment will have a greater effect than changing the human being itself. And here DNA analysis gives us an insight into which environment is the one we need. When asked what policymakers should do, **Professor Cassiman** stated that the EU still has no common position on DNA

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testing, which is absurd. Europe should have one agency that decides on standards, so that everyone can be tested.

Robotics

According to **Dr Sabine Hauert**, robots are already leaving the lab. Nowadays you can find them on Mars, in oceans and the sky, but also in your house, at work, on and even inside human beings. The newest versions of robots in the workplace are co-bots, so-called collaborative robots that can be taught how to work, but most robots are still limited to one particular task. Therefore de-hyping the present state of robots is important, which in turn requires communication skills that scientists often do not possess. The European Commission should finance more research in communicating these issues.

In answer to questions from **Ms Delvaux-Stehres** regarding the threats posed by artificial intelligence (AI), issues of autonomy in the next generation of robots and the likelihood of job losses, **Dr Hauert** highlighted the gains in productivity that often even lead companies to hire more employees in other fields. Nevertheless, the situation could be different over the long term. Here, one should not forget that technology has always displaced jobs, as it did in the past. And it is to be questioned how many employees will be doing the same type of work in 20 years from now. But per se this is neither a good nor bad thing.

Dr Noronha believes that education and communication between industry, state and society are the solution to this problem (an argument contested by others on the ground that change through education alone is too slow), and warned that uneducated societies might want to stop research out of fear, which would be detrimental to scientific progress. **Dr Ferone Creuzet** added that sustainability should also be considered in this debate, as progress in robotics and AI come hand in hand with the end of labour-intensive economic models and emerging trends favouring less production. Therefore, both trends would decrease the availability of jobs.

Asked about trust in relation to robots, **Dr Hauert** highlighted the advances in machine-human interfaces, where, at some point, robots would describe how trustworthy they are when working. The best example for different ways of building trust can be observed in autonomous car technology: while Google tries to become fully autonomous, current car manufacturers work more iteratively, advancing from autonomous parking to independent lane following. This iterative development always needs to be accompanied by the car outlining the level of trust it should be granted by the driver. These developments need to be accompanied by a legal framework and testing standards.

Transhumanism

According to **Dr Ferone Creuzet**, transhumanism is not a scientific theory, but a concept, and its beginnings can already be observed in our present everyday lives. What is parentage, she asked, if the DNA of three persons is used as genetic foundation for a child, as was recently carried out in the UK? The smart phone is already an important technical prolongation of the hand and the possibility of enhancing brain capacity exists. To this **Professor Cassiman** added that people are forgetting that "*dying*

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is normal". So what will the implications be, if you can either be an old person and a burden to society or pay huge amounts to be made younger in the near future?

"We do not have to talk about *immortality*", said **Dr Ferone Cruzet**. But simply stretching lifetime to 150 years in good health would change society entirely. Especially problematic are the underlying assumptions of transhumanism: that ethics is replaced by sheer possibility, that this is a process guided by a for-profit industry and that this crowds out other, maybe even more important research.

What could be done must be based on the question what it means to be human. Robots and humans could get along very nicely, but what if there were more than one human species due to robotic and genetic changes? What about affordability and equality in such a world? Will we be happier because we turned into a superior race that survives disasters which normal people would not? What about other parts of the world, like Africa? The need for an ethical development of human dignity became apparent during the discussion, especially with the transfer of genetic changes to the next generation, which is a red line for **Professor Cassiman**.

Science and Society

Dr Noronha highlighted that, as more people self-organise in order to participate in choosing options of scientific and technological advancements, we will need both an eye-to-eye discussion between scientists and citizens and sources of reliable information to support decision making. Therefore, the state has to prepare spaces of public engagement between science and society, as her institution, *Ciência Viva*, provides. This means de-complexifying issues, finding hands-on approaches and explaining through stories or objects. After explaining DNA research in this way, one could ask who should have access to information and who should not. Would citizens still agree that insurers could obtain their DNA?

Dr Hauert reminded us that science will be more transdisciplinary. Her own research involves biology, IT, complexity studies, medicine and nano-technology to fight cancer. This requires a new scientific framework, one that is currently being built.

For **Dr Ferone Cruzet**, the rapid progress of science is in need of a more sustainable world that can cope with this progress. Only the resilience of such an environment would provide enough stability, and without it we would start changing the world and ourselves in an unstable and destructive way. The question is whether we can build this democratic and sustainable resilience quick enough as we do not have much time.

Authors: Leopold Schmertzing, DG EPRS, Policy Advisor Global Trends Unit and Valerie Hoogewys, DG EPRS, Trainee Economic Policies

Summary of the Future Society Panel: The World in 2030

What kind of society – national, European and global – do we want to live in by 2030? Which societal trends will shape the coming years? These questions were discussed by the second panel of the ESPAS-conference on Global Trends 2030 – The Economic and Technological Revolution on 13 November 2013. The session was chaired by the President of the EU Committee of the Regions, **Markku Markkula**.

Global Societal Trends

Dr Svitlana Kobzar gave an overview of five key trends, based on the RAND report on global societal trends carried out for ESPAS.

The first trend is the rise of the global middle class. A proportion of the population in developing countries will enjoy increased wealth, and this will empower many as active and critical citizens. It will also alter their views on social risks and dangers. The new middle classes will be more demanding towards their governments. Will governments be responsive to rising expectations? Or will unanswered hopes produce disillusionment and radicalisation? Kobzar suggests that regions will have an important role as intermediaries prompting government responsiveness.

The second major trend is the continuing growth (in developing countries) and ageing of the populations (in developed countries). Ageing will strain the resources of the welfare state.

The third trend is linked to the second: groups such as migrants, young people and older generations risk greater marginalisation in the labour market. Austerity measures have already had this impact. Investment in human capital through early education is needed to avoid a lost generation – not only of young people, but also of migrants and refugees. This in turn can result in radicalisation and social unrest.

Fourthly, patterns of migration are changing. There are 60 million displaced people worldwide, and there is a refugee crisis on Europe's doorstep. Increasing urbanisation and the further isolation of rural areas are also apparent.

Finally, interconnectivity is growing all over the world. We can expect rapid, but incremental changes in some cases, and disruptive changes in others. We will also need to address an increasing digital divide between and within countries.

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Overcoming incrementalism in order to move towards more sustainable societies

The Executive Director of the European Environment Agency, **Dr Hans Bruyninckx** emphasised that Europe has to do more to achieve a low carbon society and to move towards a more sustainable society. It is no longer enough to focus on incremental efficiency gains. Rather, we need bold steps, embedded in a common European strategy linking sustainability with urban life, agriculture and mobility.

Even with present commitments, the world is facing a global temperature rise of 3%. However, Bruyninckx stressed that we have made progress in the last 20 years. The 1997 Kyoto Protocol included only 30 countries, whereas almost every country on the planet will attend the 2015 Paris Climate Summit. Moreover, 2014 is the first year in history in which more capacity was installed for renewables than for traditional energy sources.

Much greater investment in renewables is needed, including in India and China. Monitoring is essential. Solidarity with developing countries – with significant levels of investment – is also crucial. We should prepare for the low-carbon future. Bruyninckx noted that Europe, more than any other continent, has the technological and industrial infrastructure to remain competitive after decarbonisation, and even to become "the Silicon Valley of the 21st century". Private and public investment should support economic actors so that we keep and expand this comparative advantage. Other countries, and China in particular, will not hesitate to exploit new market opportunities in order to become more competitive globally.

Connecting the dots – reinforcing the cooperation between private and public actors

Dr Cécile Wendling, a foresight specialist working with a private corporation, urged more cooperation and dialogue between private and public actors. A 'join the dots' approach would allow a more comprehensive response to global challenges.

An example of such collaboration is the 'She for Shield' initiative, which involves private companies and the World Bank. This seeks to improve insurance protection for women worldwide, and thereby to empower women to play more important roles in public life. Innovative approaches can also assist in the reception and integration of refugees – many own a smartphone, which can give access to services such as micro-insurance. For the elderly, a breathing monitor in the home can prevent medical emergencies by detecting problems early.

Dr Wendling noted that more companies are using Integrated Reporting, giving details of their environmental impact and their human capital as well as their financial returns.

Rising inequalities and the fragmentation of growth – risks and chances

Dr Franck Debié, head of the European Parliament Secretary-General's EP 2025 Team, noted that trends in demography and labour markets are exacerbating inequality between and within countries. For both private households and small and medium-sized companies, access to credit is becoming more difficult. There is a growing gulf between cities such as London, Istanbul and Berlin, which attract investors on a global scale, and rural areas facing falling prices and investment. We also see an emerging division of

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economies and labour markets into formal and informal sectors. The formal economy is well regulated and provides job and social security with good salaries; the informal sectors with low paid 'outsiders' are less visible, less regulated and lack security.

Nevertheless flexible labour environments can prompt social innovation and individual empowerment. Solutions are not going to come from centralised actors such as governments, and society will not wait for institutions. Often, the most important innovations come from companies, NGOs and individuals. To make the best of the present situation, labour mobility in Europe needs to improve. Unlike the US, a large majority (sometimes 95%) of the population of European cities are born there. We should support mobility and connectivity.

Conclusion – Pro-actively shaping the future instead of reacting to crisis

The panel agreed that the various global trends are interlinked. This strengthens the case for long-term strategic analysis. Hybrid forms of cooperation support for decentralised innovation, investment in the future and the pursuit of long-term policy choices are all needed if Europe is to shape the future, rather than be shaped by it.

Authors: Eamonn Noonan DG EPRS, Policy Advisor Global Trends Unit and Julian Göppfarth, DG ERPS, Trainee in the Office of the Director General

Summary of the Future Geopolitics Panel: The World in 2030

The third panel on day two dealt with long-term trends in geopolitics. The session was chaired by **Maciej Popowski** of the European External Action Service. Mr Popowski began by referring to the global power shift currently underway, to which the EU is responding with a thorough review of its own external strategy. Some big questions arise: one concerns American leadership, which will be assessed by the USA's capacity to respond to crises; the EU also needs to consider its own system of alliances. The transatlantic partnership is crucial, but it is not enough. How can the EU develop its relations with China, or Russia? What of regional organisations, which are assuming larger responsibilities in some areas, as with peacekeeping in Africa?

The rise of Asia and changing perceptions of the nation state

Dr Jonathan Holslag of the Free University of Brussels suggested that Asia is becoming one geopolitical entity: its subdivisions are becoming less relevant, and the interconnector is China. China now spends more on defence than Japan, South Korea and India combined.

Sir Robert Cooper, Senior Fellow at the Dahrendorf Forum, noted that the European world (i.e. European pre-eminence) ended with the end of the Cold War. Now we have non-European Great Powers, including former developing countries. The world is more foreign to us.

The panel discussed the apparent paradox that, while the West is increasingly disenchanted with the nation state, the East is embracing it vigorously. The emerging powers are self-absorbed and fiercely sovereign, according to Cooper. Holslag noted that loss of trust is also appearing in China, as less of the spinoff from economic growth benefits the general populace.

It is also paradoxical that society is more diverse and more empowered than ever, but at the same time, closer regulation means that states are more powerful than ever.

Security challenges

The transatlantic relationship is fundamental, and NATO has found renewed vigour in the light of Russia's actions. It must however strengthen cooperation where there are common weaknesses. There are also areas where US and European perceptions diverge. Hard politics is back, and NATO is being tested. Attempts are underway to exploit bilateral commercial relations to divide EU countries, for example. The migration crisis has a geopolitical dimension, and military power is no longer a monopoly of the state.

The US will remain the leading military power for a long time. Yet Saudi Arabia now has the fourth largest defence expenditure in the world: ahead of both the UK and France, and only slightly behind Russia. This seems to suggest a lack of faith in the US as the guarantor of international order.

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Economy, technology and geopolitics

Economic and technological developments have major implications for international relations. The US and Europe are struggling to maintain their leadership on technology, and it is important to work together in a balanced, confident relationship. Demographic trends show the EU and US populations ageing, with Africa and Asia experiencing a youth 'bulge'.

China faces big challenges on inequality (both urban/rural, and coastal/interior). The government strategy is to make a big push now to achieve high income status by 2021 (US \$ 12,000 p.c./p.a.). The Chinese will then rebalance with social reforms. This push will stimulate China to be more aggressive in foreign trade policy. The Chinese economic model of cooperation with other countries has an exploitative aspect: over time, the partner's economy may suffer, rather than develop.

The conclusion of the Transatlantic Trade and Investment Partnership (TTIP) would reinforce the US-EU relationship, but Europe does not align with the US on every issue – the Asian Development Bank being a case in point. The Member States will continue to seek to develop bilateral commercial relations with China.

Challenges and opportunities for the EU

Dr Alexandra de Hoop Scheffer of the German Marshall Fund pointed out that no European leader is currently promoting the European project: the only ones talking passionately about the EU are its opponents. This should be redressed; the younger generation needs to hear a new narrative and a new rationale for European union. Another paradox was mentioned: people are more connected – but they participate less.

All agreed that deep internal divisions and lack of cohesion among Member States were serious problems. A problem of legitimacy and lack of credibility undermines Europe's political institutions.

While the EU remains an attractive place to live – and a magnet for migration – it must overcome these weaknesses, otherwise it faces being eclipsed by emerging powers in the international arena. This calls for resolute leadership.

Authors: Eamonn Noonan DG EPRS, Policy Advisor Global Trends Unit, Adriana Galardini, DG EPRS, Trainee External Policies and Michela Delle Coste, DG SGAD, Trainee Interinstitutional Relations

Summary of the Closing Session

The ESPAS annual conference 2015: Take away messages

Representatives of the European Parliament, the European Commission and the European Council addressed the closing session of the 2015 ESPAS Annual Conference.

Klaus Welle, Secretary General of the European Parliament, recalled that ESPAS started as a pilot project, championed by James Elles MEP. This event marks its transfer to a permanent mode. The initiative is about creating a common approach across the institutions; this is an important shift. A culture of cooperation is advancing. The ORBIS database is a major part of this, providing a common reference point of relevant studies from around the world. The EU has grown through crises, but developing a policy response in a crisis is painful. Working on long term trends is about asking "are our systems resilient enough?" and planning accordingly.

Ann Mettler, Head of the European Political Strategy Centre, European Commission, is the Chair of the European Strategy and Policy Analysis System. Mettler stressed that all sectors are changing at unprecedented speed, and this poses huge challenges. There is a great need for foresight. Future shocks cannot be ruled out, whether from the economy, from technology changes or from social developments. Disruption is here to stay, and we must deal with it. This raises questions about the role of policymaking. We need to embrace management by foresight. Foresight is about having the courage to shape the future. The conference keynote speaker, Dan Tapscott, commented how remarkable ESPAS was: open collaborative work between institutions. Now it is time to take ESPAS to the next stage.

Geneviève Tuts, Director for Interinstitutional relations of the Council of the EU, stated that the ESPAS conference had provided much needed time for reflection. The Council fully supports ESPAS; it is important to bring the institutions together – no single institution has a monopoly on wisdom. With the ESPAS Global Report and with this conference, we have entered an operative mode. We are officials, but we bring analysis to the policymakers. As stated during the recent European Parliament debate on migration, in our lives we are responsible not only for what we do, but also for what we do not do.