



## Reviews and Reports of Meetings

This selection of our blogs is one that explores a variety of reviews published during 2022 along with those that summarise some of the speeches we gave and meetings we attended.

### EC Strategic Foresight Report - review



*Image by KELLEPICS from Pixabay*

After our report to the European Commission to develop a system for using foresight to develop EU R&I in which we developed four global scenarios for 2040 and expanded on these in 10 different global regions, we continue to take a close interest in their foresight activities. In December, the EC published its second annual Strategic Foresight Report, ***'The EU's capacity and freedom to act'***, that builds on the 2020 report which introduced resilience as a new compass for EU policymaking. The 2020 report explored four dimensions: social and economic, geopolitical, green, and digital and analysed the EU's resilience in response to the COVID-19 crisis in the context of the acceleration or deceleration of relevant megatrends.

The foresight process included consultations with Member States and discussions with partners in the European Strategy and Policy Analysis System, a literature review, Delphi survey (involving Commission services, the European External Action



Service and relevant stakeholders from academia, industry, civil society, public administration and international institutions) and scenario building.

The report examines emerging issues, uncertainties and choices that will shape the future of Europe and the world. It identifies four megatrends:

The first of the megatrends is **climate change and other environmental challenges**. They particularly note its effects on:

- **Migration:** weather-related events displace around 23 million people each year; by 2050, climate-related disasters could mean that over 200 million people need humanitarian assistance every year.
- **Water and food security:** Spain, Italy, Germany and Poland are already experiencing water stress; it will cause increased food insecurity and price shocks, with over 40% of the EU's agricultural imports becoming highly vulnerable to drought by 2050. The agricultural activity zones will not move northwards because higher average temperatures in Northern Europe will be accompanied by the risk of increased cold waves caused by a weakened Gulf Stream.
- **Biodiversity loss and change in the nitrogen cycle:** agriculture is causing far greater change to the nitrogen cycle than the modification of the carbon cycle resulting from greenhouse gas emissions. This affects freshwater, coastal areas and human health, with huge economic consequences, as much as €3.5-18.5 trillion per year in ecosystem services from 1997 to 2011 and an estimated loss of €5.5-10.5 trillion per year due to land degradation. There are also major risks from invasive species and loss of pollinators.
- **Public health:** challenges include infectious diseases, advanced antimicrobial resistance, non-communicable diseases (cancer, diabetes or obesity), and mental health problems. In addition, with climate change certain diseases (malaria or dengue) will become more prevalent further north.

Next the report considers **digital hyperconnectivity and technological transformations**. The authors are concerned that, despite Europe's current strong position (it accounts for almost 20% of the world's total research and development, publications and patenting activity), it lags behind global competitors in private investment into research. It is behind major countries in AI and key quantum technologies. Other areas to address include microelectronics and green technologies, such as hydrogen and advanced fusion-based nuclear reactors. Massively increasing connectivity radically changes many industries, products, technologies and services, but also brings risks of cyber-attacks. Automation could mean 14% of adult workers' jobs are at risks and although new jobs will appear, they will require new skills – managing the social disruption will be a challenge.

The third megatrend was **pressure on demographic models of governance and values**. 2020 was the 15th consecutive year of a decline in political rights and civil



liberties at a global level and democratic governance is declining across the world. Geopolitical contestation and inter-state polarisation are increasing and zones of instability and conflict close to the EU are likely to persist. Large-scale disinformation online will increasingly drive a new type of information warfare, threatening democracies, polarising debates, and putting health, security and the environment at risk.

Last, the report considers **demography**. Population will decline in the advanced West and in East Asia, with Asia as a whole reaching an inflection point around the middle of the century. Sharp rises in total-age dependency ratios are projected for many EU areas – by 2050 there may be 135 dependent non-workers for every 100 workers in the EU. With the changing demographic pattern comes changes in economic power, and hence geo-political power generally. However, increased inequalities, lower environmental and labour standards remain key challenges for emerging economies.

The energy transition will further contribute to the redistribution of power. Fossil fuel exporters will lose out to countries with a large capacity to generate and export renewable energy. The EU can expect continued tensions with China and Russia; new tensions could arise in contested areas, such as space or the Arctic; organised crime, extremism, terrorism, and the “weaponising” of migration for political purposes, could increasingly threaten EU security. In this context, an increasingly multi-polar world will challenge the effectiveness of global governance structures.

These four megatrends correspond quite closely to **SAMI's own megatrends**. We would argue that the demographic shift will lead to a change in attitudes in the West towards being more welcoming to immigration. We also think there are generational changes in attitudes that could lead to more positive outcomes. The full power of the biotechnological revolution has yet to be seen, and AI could radically shift economic power – the global competition in that field is indeed critical.

On top of the megatrends we should consider **“wild cards”**. As well as further pandemics, massive climate events and global geo-political flashpoints, one can imagine a major technological failure of satellite systems, or the collapse of the communist party in China. Medical advances could increase life expectancy to the extent that ageing populations become a major challenge.

The later section of the report turns to policy proposals, identifying **ten strategic areas** the EC should address. These include ensuring sustainable and resilient health and food systems; securing and diversifying supply chains, especially for critical raw materials; more assertive EU “standard-setting”; developing and retaining advanced skills and talents; and trying to buttress multilateralism.



Finally they comment that ***uncertainty, volatility, complexity and ambiguity*** will increase. Developing strategic foresight capabilities will be needed to assess the impending risks and better prepare to deal with crises and emerging opportunities. The EU Foresight Network of Ministers for the Future, and the related development of foresight capacities at national level, will be contributing to this. The next Strategic Foresight Report will focus on a better understanding of the twinning between the green and the digital transitions, i.e. how they can mutually reinforce each other, including through the use of emerging technologies.

*Written by Huw Williams, SAMI Principal, 14 Jan 2022*



## World Economic Forum Global Risks Report 2022



*Image by Wokandapix@pixabay.com*

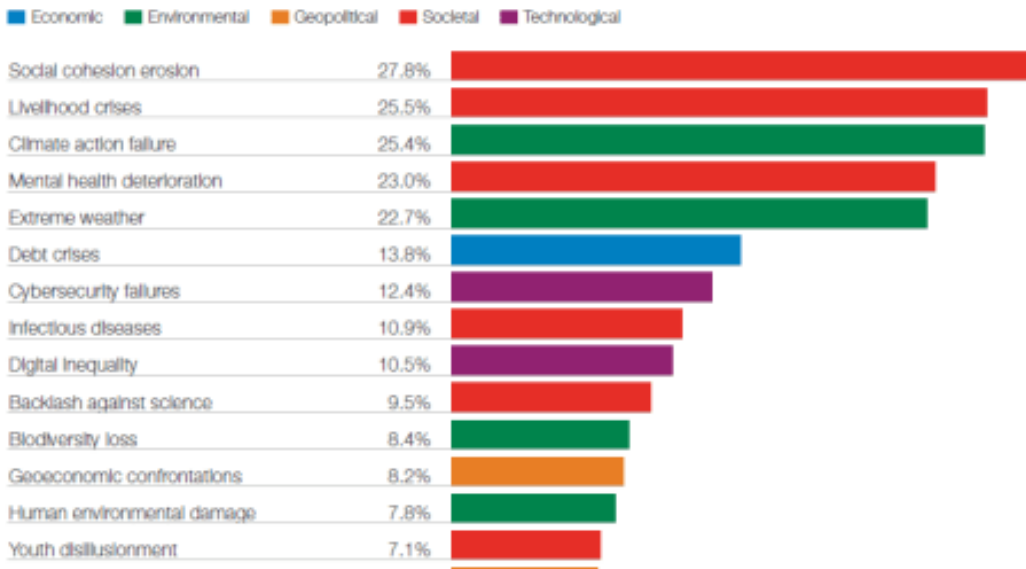
As usual in January, the World Economic Forum has published the results of its Global Risks Perception Survey (GRPS). For this, the 17<sup>th</sup> annual report, the survey was refreshed to gather new and broader insights from nearly 1,000 global experts and leaders who responded. This year the Global Risks Report also draws on the views of over 12,000 country-level leaders who identified critical short-term risks to their 124 countries. It's not a survey of futurists, so one might expect the outputs to be more relevant in the shorter-term. Nonetheless, it does give an insight into the views of a large group of very influential people and the actions they then might take.

The report notes that the global pandemic has increased inequality, with richer, more vaccinated countries returning to pre-pandemic levels, whilst developing economies (excluding China) will have fallen 5.5% below their pre-pandemic expected GDP growth. Social issues top the list of risks that Covid-19 has made worse.



## COVID-19 Hindsight

Risks that worsened the most since the start of the COVID-19 crisis



Looking forward the survey identified several key, and worryingly inter-related, themes.

## A divergent economic recovery threatens collaboration on global challenges

The differences between the rich and developing countries' rates of economic recovery is compounding labour market imbalances, protectionism, and widening digital, education and skills gaps. Inequality is a concern within G20 countries too – "Social cohesion erosion" is a top short-term threat in 31 countries—including Argentina, France, Germany, Mexico and South Africa. Together these forces threaten both the scope for international collaboration (eg on climate change) and stronger national interest postures.

## A disorderly climate transition will exacerbate inequalities

In a potentially lethal vicious circle "Climate action failure" – seen as the greatest risk – would fail to account for societal implications, and exacerbate inequalities within and between countries, heightening geopolitical frictions, and creating yet more political complications that further slow action. Given the scale of the technological, economic and societal change required, and the insufficient nature of current commitments, survey respondents tended to think that the transition to net-zero by 2050 would be "disorderly".

## Growing digital dependency will intensify cyberthreats





Rapid digitalisation of many industries has led to a boom in malware and ransomware attacks – up by 358% and 435% respectively in 2020. This could become another cause for divergence rather than co-operation among nation states, as tensions between governments impacted by cybercrime and governments complicit in their commission become more severe.

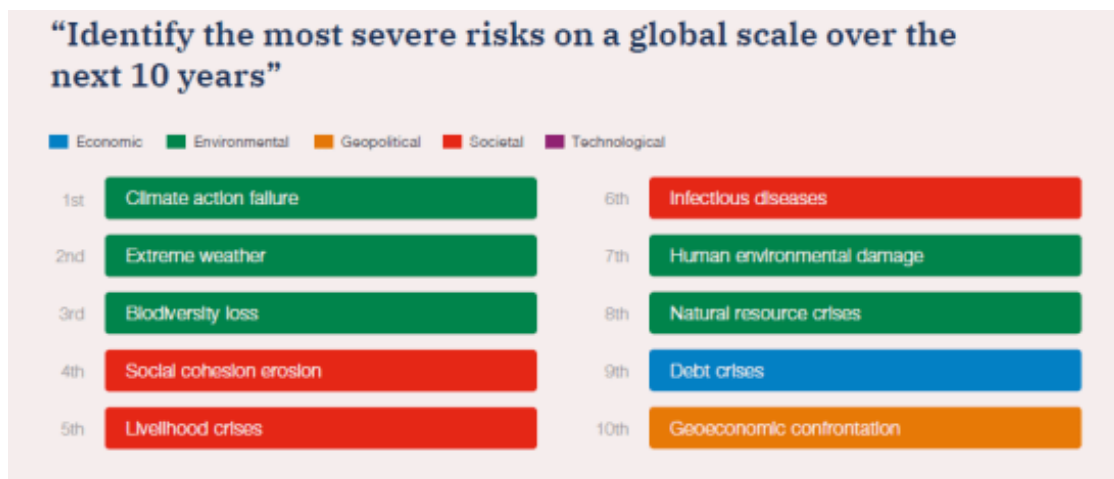
## Barriers to mobility risk compounding global insecurity

“Involuntary migration” caused by economic hardship, intensifying impacts of climate change and political instability, already forcing millions to leave their homes in search of a better future abroad, is seen as is a top long-term concern for GRPS respondents. The likely response of increasing barriers to immigration is increasingly inappropriate when there are so many unfilled vacancies. (The Report doesn’t address the issue of falling populations in richer countries).

## Opportunities in space could be constrained by frictions

Increasing commercialisation of space and a massive increase in satellite numbers, combined with militarisation by some powers, risks major frictions if not managed co-operatively. Collision risks have already been seen potentially rendering viable orbits unusable because of debris.

**The top ten risks** identified are shown in the chart below:

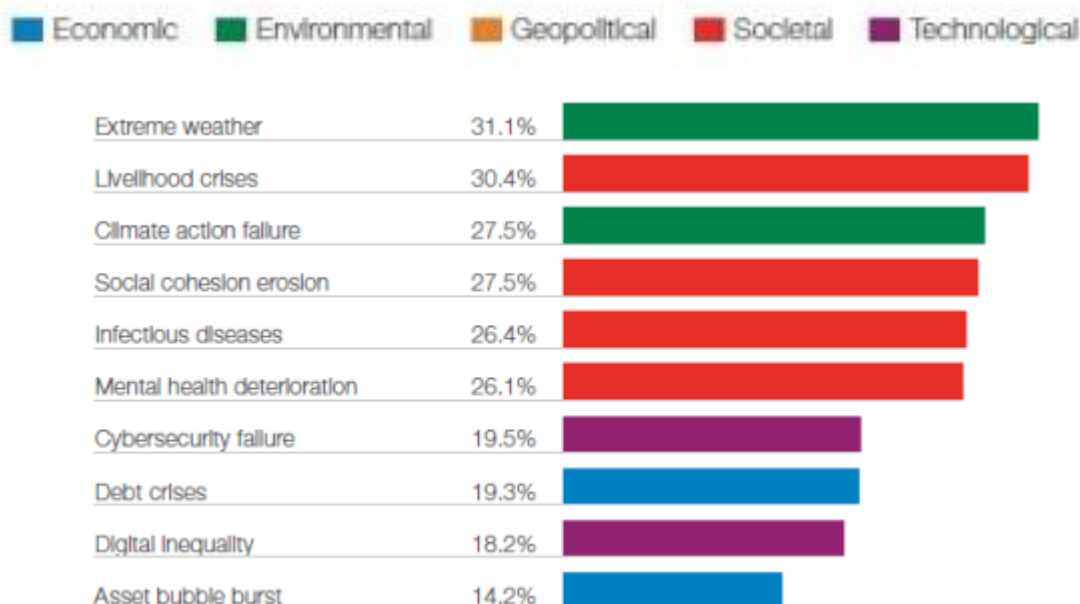


Respondents were also asked about **the timing of risks**. In the 0-2 year horizon societal factors were in 4 of the top 6 positions.

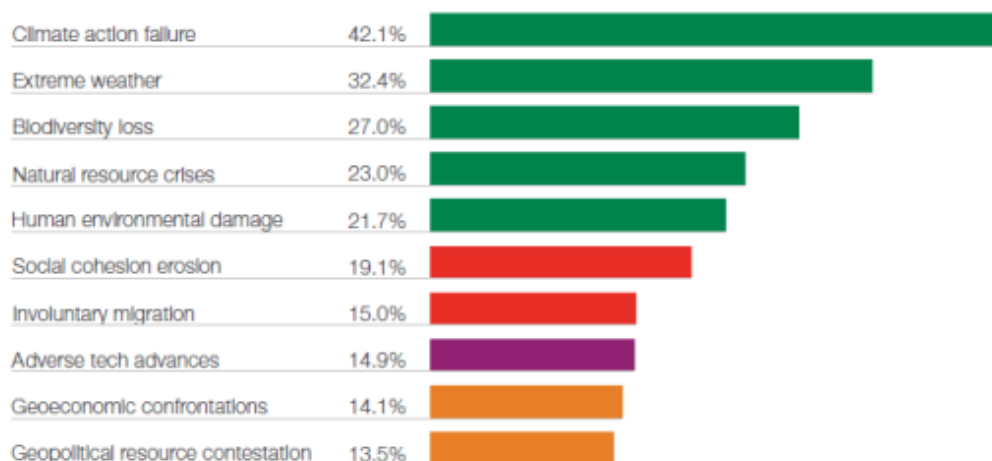


## Global Risks Horizon

When will risks become a critical threat to the world?



But over the 5-10-year horizon, environmental issues take all of the top 5 positions, suggesting respondents take a pessimistic view of the COP 26 discussions. Geopolitical issues also rise in importance.



The report ends with a discussion on **resilience**. This is an area we have addressed in our blog before – we have compiled those thoughts into a [Working Paper, available here](#).

*Written by Huw Williams, SAMI Principal, published 2 Feb 2022*





## Transatlantic Co-operation on Strategic Foresight



*Image by Marlene Bitzer from Pixabay*

On 14<sup>th</sup> March, 2022, Maros Sefcovic, Vice-President of the European Commission for Interinstitutional Relations and Foresight held a fireside chat with Julia Friedlander of the Atlantic Council GeoEconomics Center, to discuss transatlantic cooperation on strategic foresight, including prospects for a new international foresight network between the United States and the European Union.<sup>1</sup> Naturally with such a format the conversation went back and forth at times: what follows is a summation of the main points covered.

Mr Sefcovic said that that the original purpose of the meeting had been to discuss co-operation on energy, and also how to avoid dependencies on key technologies and critical raw materials, but the current crisis meant that transatlantic bonds needed to be fostered even more to help Ukraine. There were three questions: how to support Ukraine; how to deal with Russia, and how to end “this senseless, useless war”.

It was important for Europe and the U.S. to be as connected as possible and for there to be a strong transatlantic perspective on foresight so that “we can forge the world as we would like it to be.” They also needed to strengthen collaboration on supply chains, and co-operation on energy security, energy infrastructure and liquefied natural gas.



Mr Sefcovic pronounced that the Russian invasion of Ukraine was a 9/11 moment for Europe, and a key moment in shaping relations for the rest of the century.

Ms Friedlander's first question was central to the whole point of foresight: "Was it [the Ukraine invasion] on your radar?" Mr Sefcovic pointed out they were dealing with sensitive matters here – in other words foresight was overlapping with the area of intelligence – but subsequently stated that there had been co-ordination between the two continents since last Autumn / Winter. (Indeed we know from other publicly available sources that western intelligence had been monitoring the possibilities for months.<sup>2</sup>) He stressed the importance of transatlantic co-operation here so that both countries had the same thing on their radar screens: this would facilitate making foresight actionable, and facing politicians with inconvenient truths. There needed to be cross fertilisation with think tanks, including the Atlantic Council.

Ms Friedlander then moved the discussion to actions taken by the "alliance", and the importance of avoiding retaliation. Mr Sefcovic said that Europe had taken the decision to reduce by two-thirds their dependence on Russia for fossil fuels. This meant acquiring 50-60 billion cubic metres of gas from elsewhere, and the aim was to have a secure supply of 90% of their requirements by next winter. Energy suppliers needed to make more investment and extend their operations. The green transition needed to be used to conserve more. The Germans' decision not to avail themselves of the new Russian pipeline, Nord Stream 2, was important in the fight to help Ukraine.

He elaborated on how the EU's approach to energy had changed. Normally the EU budget for 7 years was €1-1.2 trillion. In the last year, they had effectively doubled the budget by offering €800 billion worth of green bonds for greening, digitization and structural reform, nearly double the existing budget, and these had had been oversubscribed. However, he acknowledged that knowing how to raise money on the financial markets was not the answer by itself, and pointed out that it could not be spent on just anything, tranches of money would only be released as milestones were met. Ms Friedlander acknowledged that the U.S. was good at throwing money at problems, but not necessarily following through. Mr Sefcovic added that European countries had more space for autonomous actions as the EU. If you unbundled energy and other players rebundled it from the capital of a foreign country, this made you vulnerable.

Naturally, the situation in the Ukraine took up a substantial part of the discussion. Ms Friedlander admitted that, "No-one knows what is going to happen." Mr Sefcovic said that they must look ahead to rebuilding the housing and infrastructure of the Ukraine, and conversations were already taking place with IMF. The danger of high inflation might slow economic growth, but this might help push countries in the direction of financial integration, and could herald a new era for the euro. In terms of freezing



Russian central bank reserves, it was no good if just the U.S. did it, but the EU was a bigger player in this respect and had frozen more assets than the U.S.

Finally, as both a Slovakian and a parent (Slovakia shares a border with the Ukraine), Mr Sefcovic spoke movingly of the huge numbers of Ukrainian refugees moving westwards, particularly unaccompanied minors, and on the need to provide them with health services, education and work.

Ms Friedlander concluded that two important actions to take were to arm the Ukraine, and punish Russia financially. Mr Sefcovic said pointedly that the Russian action was not a strategic challenge but a strategic threat. The priority was to stop the war, and rebuild Ukraine.

From a foresight perspective, the intention to have stronger links in this area between Europe and the United States was welcome news, however unhappy the circumstances which had spurred them on at this time. In addition, the various possibilities of conflict in Ukraine had been correctly anticipated as far as possible, and this had enabled a response from the two continents that minimised the possibilities of escalation. Regarding long-term green investment in Europe, it was reassuring that the planned investment was not to be of the “scattergun” variety: the ongoing provision of resources would be conditional on results. Since the meeting, President Biden has announced that the U.S. will provide 15 billion cubic metres of liquefied natural gas to Europe before the end of the year (although this was only a fraction of the shortfall).

Peering into the longer term as futurists must do, however, the picture is not so cheering. At an Economist webinar three days before the Atlantic Council meeting, Patrick Foulis, the Business Affairs Editor, highlighted the disruption to energy, food and commodity markets caused by the Russia-Ukraine conflict. If Russian gas was cut off, Europe could survive on other sources of energy for six-nine months [but then what?] There would also be another shock to food prices in a few months, and distributive consequences in poor countries.<sup>3</sup> All this is happening before we have recovered from the disruption caused to supply chains all over the world by a pandemic which is still raging.

While the international outlook remains grim, there was at least some comfort to be taken from the Atlantic Council meeting. The [full conversation is available on the ESPAS website here](#).

*Written by Tony Diggle, SAMI Associate and published playwright, published 31 Mar 2022*



## REFERENCES

1. *“Fireside Chat with Maros Sefcovic”, ESPAS (European Strategy and Policy Analysis System), 14<sup>th</sup> March, 2022. (<https://espas.eu>)*
2. *BROWN, Larisa, “The new spying playbook: tell the public your secrets”, The Sunday Times, 27<sup>th</sup> February, 2022, p. 11.*
3. *“Ukraine at war: week three”, Economist Webinar, 11<sup>th</sup> March, 2022. (<https://subscriberevents.economist.com>) Only available to subscribers to the Economist.*





## The future of AI

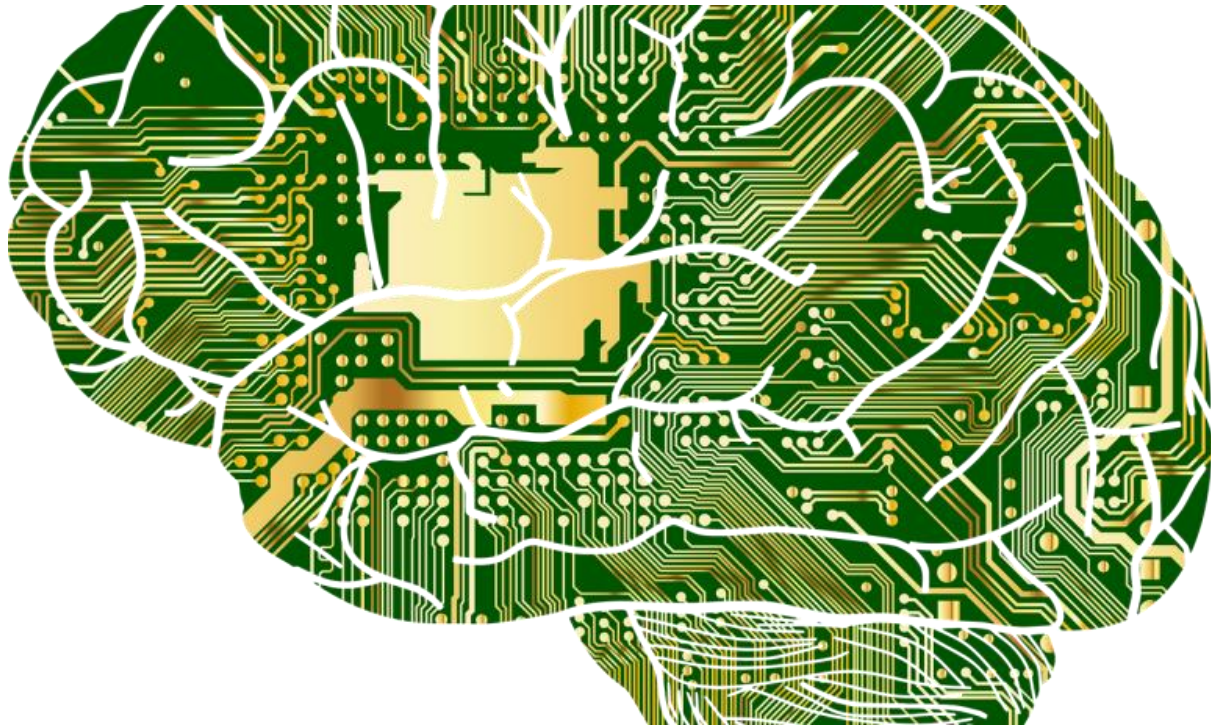


Image by [Gordon Johnson](#) from [Pixabay](#)

This is a much-edited version of a presentation given at APEC's recent "Industry 4.0: Enabling Technologies and Inclusive Digitization for Post COVID-19 Economic Recovery in APEC Value Chains" online conference. Jonathan Blanchard Smith, from [SAMI](#), and [Dr Gissella Bejanaro](#) from Binghampton University (SUNY) presented on AI, and its future.

Hanson Robotics' [Sophia](#) is what people think of when they think of artificial intelligence. "Sophia is simultaneously a human-crafted science fiction character depicting the future of AI and robotics, and a platform for advanced robotics and AI research. She is the world's first robot citizen and the first robot Innovation Ambassador for the United Nations Development Programme."

But what is the future of AI in the context of Industry 4.0? Looking to the future is vital for 2 main reasons – Industry 4.0 has happened, and will shortly be replaced by industry 5.0 ... And what AI is now is different from what it will be.

It's important to understand that Industry 4.0 is, essentially, industry now. The future is in its developments. We don't have timelines for these – what we've done is set up a series of technology hurdles, and we're describing periods as you overcome those hurdles.



INDUSTRY 5.0 is described as “*people working alongside robots and smart machines*”, and includes AI, Connectivity, Robotics and the development of such innovations as “Smart Cities”. Industry 5.0 is more human-centric than the process-driven 4.0.

INDUSTRY 6.0 evolves further. It is “Ubiquitous, customer-driven, virtualized, antifragile manufacturing”: customer-centric, highly customized, with hyper-connected factories and dynamic supply chains.

INDUSTRY X is where it all comes together: *the nexus point of industry, AI, biotechnology, IoT: green, circular, cognitive manufacturing*. All pervasive and truly revolutionary, this is where the future really lies.

Our first question is about business models. Currently, business model thinking is focussed on what we could call ideals. That is because industry is still struggling mentally with how to grip AI.

Reading the literature throws up ideals such as:

- Agile customer co-creation
- Technical standards
- Scalable ecosystem integration.

These are not easy concepts to grasp, still less implement. And I think there are some serious questions coming up about business models in relation to AI, and Industry 5.0 and beyond. In some cases, the changes to business models are going to have to be as revolutionary as the changes in technology.

AI does not happen in isolation. It is accompanied by the industrial revolutions we have discussed before: 5G, the Internet of Things, blockchain, and numerous other changes.

But it will be utterly revolutionary. David Vandergrift says, there is no sign of it capping out: “Anybody making assumptions about the capabilities of intelligent software capping out at some point are mistaken” And as Bill Gates warns, “A.I. is like nuclear energy — ‘both promising and dangerous “; “it will change society in some very deep ways” Some aspects of us looking at the future are what those very deep ways are.

## The future

AI will change the way we work. It will do some jobs better than we do. It is true that every technological change brings disruption, as old jobs are replaced by machines. It's been like that since before the industrial revolution. But it's also true that every





technological revolution generates new jobs – there are more people in work after a technological change than before it. We imagine the same will be true, at least for the foreseeable future.

Some of the more conceptual processes we will have to deal with include “The future of AI is the future of work” – essentially, what we anticipate using AI for is to complement human labour. Whether that replaces people, or, as in the evolution of “cobots”, complementary robots, enhances humans’ ability to work better, is currently moot. Smart manufacturing has the ability to remove people from the loop altogether, whilst producing better products at higher quality more consistently. “Conversational AI”, where the ability of the AI to understand natural human speech well enough, and answer questions intuitively enough, will replace people in some interaction tasks.

Smart cities give the promise of coordinated transport links, energy efficiency, and enhanced living standards. If AI is to be truly human-centric, one of its most beneficial impacts will be on the improvement of our urban environments. It is clear, though, that one of the largest conceptual problems humans will have to deal with when AI becomes properly embedded is the de-humanisation of so many functions – whether they be jobs, or simply person-to-person interaction.

### **Where will AI have the greatest impact in the near future?**

In entertainment, there could be custom movies featuring virtual actors of your choice. “Sophisticated predictive programs will analyse a film script’s storyline and forecast its box office potential.”

There will be medicine tailored to your genome. AI algorithms will enable medical professionals to customize health care to the genes, environment and lifestyle of each patient. Diagnostic accuracy will increase, as will drug discovery. Nursing assistants may become virtual – or robotised.

AI will replace people in many vital tasks – assistants will help people stay independent and live in their own homes longer. AI tools will keep nutritious food available, safely reach objects on high shelves, and monitor movement in the homes of the elderly and differently abled. The tools could mow lawns, keep windows washed and even help with bathing and hygiene.

Equally, AI tools, robots and cobots could replace humans entirely in high-risk activities – mining, firefighting, clearing mines and handling radioactive materials.



Self-driving vehicles, and autonomous systems, will move from the drawing board to the streets, rails and perhaps even the air (if Boeing has its way). Inevitably, they will also move into law enforcement and onto the battlefield.

No discussion of AI would be complete without thinking about personal augmentation. Smart glasses, when they work properly – and they're getting there – will soon be followed by smart contact lenses. Elon Musk's Neuralink promises “ultra-high bandwidth brain-machine interfaces to connect humans and computers”.

And AI can compensate for illness: working with paraplegics to use nascent neuromuscular implants to help them regain the use of their limbs, as well as with the blind and deaf to help them approximate sensations of sight and sound.

The future is at this stage unformed, but there are indicators: Quantum Computing, Immersive Realities and Digital Twins. As we move from specialised AI to general AI to Artificial general intelligence, the opportunities, and risks, are endless.

Which takes us to ethics. AI is already used for facial recognition, mass data capture and analysis, social credit systems, and the honing of algorithms which direct social media consumption.

AI is built by people – who have biases, and feed those into the AI, which uses them to make its decisions. Understanding the effect of those biases is key – which takes us to the “black box problem”. Underneath machine learning is deep learning. And we cannot see it or understand how the machine comes to its conclusions. AI technology doesn't come with a moral code. It doesn't ‘understand’ the output it provides the same way a human does. When an AI produces a biased result, it won't notice. So, humans must instead — and that's difficult to do when we can't understand the reasoning behind the result.

The answer is explainable AI. The problem is we're not there yet. As in so much around artificial intelligence, our future depends on trying to pry out what futurists call “the seeds of the future in the present”. We know what we have. We think we know where we're going. The trick is going to be making sure that we, and our increasingly clever artificial intelligences, are aligned on that journey.

*Written by Jonathan Blanchard Smith, SAMI Fellow and Director, published 8 Apr 2022*



## Construction 2050: The Future Material Requirements of the Construction Sector



Image by [3D Animation Production Company](#) from [Pixabay](#)

Innovate UK KTN, Innovate UK and BRE arranged an online workshop and networking event on 24th March 2022 to discuss Future Materials in the context of Net Zero. A recording is available [here](#). The session covered the ways in which the Foundation Industries – ceramics, glass, cement, metals, paper, chemicals – were rising to the challenge, and how the construction industry could take advantage of their innovations.

Andrew Dunster from BRE took people through the results of some of his research into what the construction industry needed from foundation industries. While the foundation industries focused on resource efficiency and carbon reduction, the construction industry took a shorter-term perspective, focussed on cheaper and faster construction.

The key innovations in the construction industry were:

- Process: offsite production, “modern methods”
- New materials: getting more performance from less, thereby reducing carbon emissions
- Optimised design – combining different materials



- New ways of working – digital, with more shared data
- Circular economy – more refurbishment rather than demolition

Andrew described some examples:

- a composite steel/concrete design that used 46% less steel
- offsite robotic spraying concrete using a mould: 60% less embodied carbon
- circular economy: a pop-up factory removed windows and re-installed them with new gaskets and adhesive seals
- Multifunctionality: offsite bored piles, low-carbon cement, “smart” piles integrate energy and environmental control systems
- Circular economy: modular bridge elements, dismantlable; database of upcoming projects
- offsite construction using recycled steel, modular elements delivered as sub-assemblies.

He explained he expected changes in the processes of construction – new ways of working:

- Circular economy, less demolition, more refurbishment
- Offsite manufacture and Design for Manufacture
- Training and skills: more digital, more manufacturing; less site craft skills; up-skilling; more design skills; more choice of materials
- Servitisation: leasing, integrators, partners, collaboration

Under the heading “Materials and performance”, Andrew suggested:

- More careful use of materials, for lower cost and lower carbon emissions
- Recycled materials from other industries
- Increased longevity of buildings, with demolition becoming the exception
- Multi-functionality to aid installation and dismantling/re-use

There are also issues around data and design:

- Verifiable lower embodied carbon
- “Life cycle assessment on demand” to achieve sustainability goals; whole building LCA
- Data/model/design type robustness with embedded sensors
- More work at design stage

The discussion that followed raised issues relating to the dynamics of the industry:

- Many low-carbon new materials are being developed (eg hempcrete, graphene in concrete) by innovative small firms; but getting the construction industry to take them up is proving to be difficult. There is an inherent conservatism (some due to safety considerations) to overcome, and a lack of confidence in the performance characteristics of new materials.



- Offsite innovation in supply chain can put in clever bits – like auto and aero industries are based around world-class manufacturers.
- The trend to offsite construction is likely to favour big players because of the scale of investment required; onsite craft skills will become less common and SMEs will come under pressure. This in turn could create market dominance and stifle innovation. There was some suggestion that innovator SMEs could still work in joint ventures.
- There are lots of innovations elsewhere in the world, but forming international partnerships is proving difficult. There needs to be some general database for people to consult

The break-out sessions that followed covered many of the same issues around the introduction of new materials and the new for better performance data. There is a need for greater collaboration along the value chain, and a better approach to use of data.

Finally a panel session discussed the opportunities in the Foundation Industries. They were very positive and saw change happening everywhere. Key factors were:

- Material efficiency – use less materials; building cleverer, building less, re-using more
- Smart windows, smart glass – embedded sensors, lighting, signage, Internet of Things, radio-communications
- Net Zero ambitions
- An interesting view that the industry should think in terms of “Products” rather than “projects”. That allows for process optimisation, a systems approach and holistic thinking, and moves away from project cycles to long-term planning.
- Energy re-cycling – waste heat re-use – leads you to thinking of buildings as power stations.

The panel were excited by the fact that there was beginning to be an understanding that change had to be embraced if the industry was to hit Net Zero targets, and that opportunities for change had never been greater.

*Written by Huw Williams, SAMI Principal, published 14 Apr 2022*



## Construction Week - May 3rd and 4th



Image by [Tom](#) from [Pixabay](#)

The construction industry is facing a wide range of challenges, from a skills shortage through to the Net Zero commitments – on some measures, the sector contributes to 40% of the UK's emissions. The annual get-together in the Excel centre was an opportunity for industry leaders to share perspectives on the key issues.

### Modern Methods of Construction (MMC) or Offsite Construction

MMC is seen by its protagonists as the inevitable way forward, improving productivity, lowering costs and controlling carbon all at the same time. Yet it seems to be a long time coming. The conference was told by Sam Stacey of UK Research & Innovation that the Government is committed to bringing about a revolution in speeding up construction by adopting MMC in housing and infrastructure.

The Construction Playbook outlines the approach that will be adopted in the public sector to co-ordinate the supply chain to make it more akin to the automotive or aircraft industry.

There are 85 case studies of applications of digital techniques, augmented reality from design stage tools, whole life value and carbon, automated data production, and interoperability between data. These include the Forge – a kit of parts approach





used for an office block; and an intelligent approach to piling, using the hollow to exchange heat from the ground.

Techniques have been applied to school design in the public sector and transport infrastructure – building a footbridge.

Despite all this, there remains scepticism in the industry about the scale of the impact MMC will make.

## Disruptive Innovation

Sam also identified several areas of disruptive change.

1. New companies, that are not necessarily in construction at the moment but who have manufacturing capabilities, could move into the MMC market. The shift to offsite fabrication will create more opportunities for these businesses to contribute to the built environment.
2. Specialist online marketplaces. With MMC, sellers and buyers will need to communicate differently. New marketplaces, similar to Amazon or eBay, targeted at construction could emerge. First-mover advantage in this area will be important.
3. Information systems to improve productivity – more than 50% of processes add no value, with people waiting for materials to arrive and so on. Treating construction sites as a factory environment makes it possible to improve productivity by monitoring the arrival of materials in a “just in time” approach.
4. Applying techniques to reduce both embedded carbon and operational carbon emissions will be critical and create huge new business opportunities for innovative companies.

## Culture change

Several people in panel discussions and beyond identified a need for culture change in the industry. The Grenfell tragedy is already shaking up the safety culture. However, productivity and skills levels are low; diversity is poor. The industry needs to be more efficient and healthier for people – the stories the industry tells each other are key, as is the way it sees itself. To “build back better,” the industry needs to get it right. It must focus on responsibility, accountability and transparency.

Fewer than 2% of site workers are female. There are female-only contractors, but the industry does not describe the roles to attract more women. More advanced technology could even up the opportunities. With more work being done retrofitting homes, there are more roles for a diverse workforce working in people’s homes.



Organisations need to think about supporting staff of all ages and different backgrounds. Mental health is a big issue. Encouraging more young people to join could help diminish the “man-up” culture.

The industry needs to think more in terms of being more inclusive than more diverse. This involves having clear company values, enabling flexible working and being creative and bold. Managers need to have the skills to have conversations with their staff at all levels and improve inclusivity on the worksite

## Digital transformation

The Building Safety bill will require significant data management of assets, creating a need for people in the industry who are digitally able and can create data, understand data and share data. Particular skills required include:

- Data collection and instrumentation. Basic improvement even at site level, ability to take photos about what's going on site and share that data.
- Information management – ability to save information in the right place and to share it effectively.
- Data interpretation and analysis
- Data Visualization – dashboards, 3D modelling and visualization packages to get an overlay of the site
- Software development – software is seen as something that is bought in but organisations need to be able to tweak the software to suit their needs.

## Economic trends

Construction is fairly resilient. It had a fall off during lockdown but recovered and is now 1.1% larger than pre-pandemic. GDP is likely to decline in the second quarter. The housing sector was helped by the stamp duty holiday and the help to buy scheme, so has had fairly healthy growth.

There is currently a goods-led inflation, especially increasing raw material prices – timber prices are up 35%, steel 50%.

There will still be big increases in energy prices so CPI will continue to rise. The Bank rate is likely to go up again.

The Ukraine crisis creates further uncertainty – intensified sanctions could lead to a recession.

There are fewer people employed in the industry – 400,000 fewer than before the pandemic. Older workers have taken retirement and long-term sickness, and many



won't come back in the labour force so there will be a smaller labour force than before and 50,000 job vacancies in construction.

Overall, the future is hugely uncertain but better than 6 months ago; the short to medium outlook is relatively positive though with slower growth.

## Net-Zero

Climate change is a challenge but also a draw for young people, who are interested in making a difference. Wanting a career in a Green Job is one of the top 3 criteria for young people. The industry can attract the next generation of the workforce to be part of the Net Zero challenge. The industry can go onto the front foot about climate change and advertise how young people can make a difference by installing new technology. It opens up new roles in:

- Design
- IT
- Customer care
- Net Zero engineers, including retrofit
- Significant role for standards, as an enabler for the sector.
- Specific shortages e.g. asbestos inspectors as retrofits may need asbestos removal

There is a need to define core competencies for roles so that people can understand what training delivers and how they can move into roles that have similar competencies. There also need to be professional pathways to describe the digital roles, in much the same way as the adverts for the Navy are developed to attract to a profession.

There is a need to train people to work on existing buildings and do retrofit, rather than just new build as at present. The skills needed for retrofit are about integration with a whole house mindset to get all the technology working together and the supply chain well integrated. Key skills gaps are:

- Property assessment
- Advice and consumer care so customers are well informed about the options
- Low carbon heating installation
- Use of digital tools
- Soft skills to bring customers along with the journey to have their house retrofitted

## Green and renewable energy

The energy transition will see the country moving to more distributed energy generation with solar, and other opportunities for renewables. Renewables and



battery storage and flexible generation are becoming more important. Electrification of heat and transport will drive an increased need for generation.

There is a big opportunity for the construction sector in both new build and retrofits as demand increases for solar panels on roofs, warehouses and homes. Corporates are looking at own generation on site.

Offshore wind and nuclear have big targets, with a reduction in planning consent times from 4 to one year for offshore wind. There's also an ambition to scale up geothermal and marine.

The boiler upgrade scheme has gone live: there is a £5k grant for installing heat pumps but the installs typically cost £15,000. The budget is only enough to support 30,000 heat pumps installs a year despite the government target of 600,000 heat pumps per year by 2026.

## Mental Health

Mental health is an issue in construction, with suicide rates high relative to other sectors. The sector attracts a lot of ex-military who bring high level of skill but may have issues with PTSD. There is a need to identify any underlying potential issues and create policies to improve mental health, promote psychological safety, and ensure sufficient workplace adjustments to maximise the potential of individuals with mental health conditions.

In particular, there is a need to understand the signs of exhaustion and deteriorating staff welfare and encourage staff to help themselves and the team.

## The future

The future of the construction industry is being shaped by a wide range of forces. We can identify how many of them could play out, but the speed of change remains very uncertain. Traditionally, the industry has been slow to change, but the Net Zero challenge could trigger a huge wave of new developments.

*Written by Huw Williams, SAMI Principal, 1 June 2022*



## The UN Report: Our Common Agenda and Foresight - 1



*Image by Elke from Pixabay*

In September 2020, on the 75<sup>th</sup> Anniversary of the founding of the United Nations, Member States asked for recommendations so that they could better respond to current and future challenges. In September 2021, Antonio Guterres, the UN Secretary-General, presented his report, “Our Common Agenda”. This month (one year later), the Millennium Project has published a report examining the strategies in it specifically related to foresight entitled “Five UN Foresight Elements of Our Common Agenda”.

In this first blog, I shall begin by looking at the wider tenor of the original report.

The report was published when the world was just over eighteen months into the Covid-19 pandemic, and Mr Guterres is in no doubt as to the seriousness of mankind’s plight. The opening sentence of his summary is that:

“We are at an inflection point in history”



and he continues:

“... now is the time to renew the social contract between Governments and their people and within societies.”

There should be more long-term thinking and a transformation of education skills and lifelong learning.

“It will be important for the United Nations to issue a Strategic Foresight and Global Risk Report on a regular basis, and I also propose an Emergency Platform, to be convened in response to complex global crises.”

There should be a stronger, more networked and inclusive multilateral system.

“I will ask a High-Level Advisory Board, led by former Heads of State and Government to identify global public goods and areas where governance improvements are most needed, and to propose options for how this could be achieved.”

“I propose a Summit of the Future to forge a new global consensus on what our future should look like, and what we can do today to secure it.”

Key proposals principally relating to poverty, health, climate change, conflict, finance, technology and governance from the seventy-fifth anniversary declaration are then summarised, but these are inevitably just massive statements of intent.

The six chapters of the report then go into more detail: some specific points are worth and highlighting. The shocking costs of Covid-19 are given: nearly one in three people in the world (2.37 billion) did not have access to adequate food in 2020 – an increase of 320 million in one year. Early estimates suggested a potential increase of up to 45% in child mortality because of health-service shortfalls and reductions in access to food. A section on values points out that economic models continue to assume endless expansion and growth and overlook the broader systems that sustain life and well-being.

“Absurdly GDP rises when there is overfishing, cutting of forests or burning of fossil fuels. We are destroying nature, but we count it as an increase in wealth.”

Mr Guterres continues:

“I urge States, international financial institutions and multilateral and national development banks to work with us to find complementary measures to GDP that





account for the environment and to use this new measure to change fundamentally their mandates and investments.”

A section on major risks warns that an effort is warranted to better define and identify the extreme, catastrophic and existential risks that we face.

This last statement underlines again the “this is what we must do” aspect of the report. But the last section of the Chapter 4 begins with the sentence:

“Ultimately what matters is results.”

Looking ahead to adapting the United Nations to a new era the report states:

“Some Member States have suggested that the UN ... is vital to support the delivery of many global public goods, serving as a venue for collective action, norm development and international co-operation. ...

“... the UN System must adapt to play a leading role in a more networked and inclusive world, improving our collaboration and strategic engagement with other actors and forums at the global and regional levels, while also maximising our comparative advantage in service of the people who need us most. ...

“It has also been suggested that States could strengthen the high-level week of the Assembly, using it as an opportunity to take decisions and make commitments at the level of Heads of State and Government. ...

“... the high-level political forum has emerged as the primary global gathering for sustainable development.”

Three key points emerge from the report: the importance of the role of the United Nations in dealing with global issues; the recognition of the importance of foresight in that role and the need for the political will to enable appropriate action to be taken. In the next blog, I shall look at the Millennium Project Report into the foresight elements and discuss how the foresight community can enhance the UN's efforts to achieve a better response to future challenges.

*Tony Diggle is a SAMI Associate and published playwright. He was a contributor to the Millennium Project Real-Time Delphi Study and writes in a personal capacity, published 7 Sept 2022*



## The UN Report 'Our Common Agenda' and Foresight – 2



*Image by Albrecht Fietz from Pixabay*

In last week's blog, we looked back at the UN Secretary-General's Report, "Our Common Agenda", published in September 2021 in response to a request from Member States for recommendations on how to respond better to current and future challenges.

This week, we consider a report published this month from the Millennium Project, an international participatory think tank, on behalf of the international foresight community, looking specifically at five elements for improving global foresight mentioned in the original report. The report was carried out by a Real Time Delphi Study calling for judgements about the criticality of each of the five elements, and enabling participants to give their views, and then, if they so wished, in the light of comments made by the other participants, to refine their views to enable a considered consensus to emerge. The author was one of the contributors.

189 professionals from 54 countries participated, and it should come as no surprise that, given the nebulous nature of the topic and the variety of the respondents, at first sight the report seems to overwhelm the reader with a veritable avalanche of



creative comments and ideas. This is the massive endorsement that the international foresight community has given the five foresight elements of “Our Common Agenda”. It is best described by a selection of indicative comments made by the contributors: the five elements will be considered in turn.

The element regarded as very critical with the largest number of votes was the creation of a **Futures Laboratory (“Futures Lab”)**. This would include conducting future impact assessments of major policies and programmes, convening foresight and planning experts across the United Nations system and its multilateral partners and regularly reporting on megatrends and catastrophic risks. This could support states, sub-national authorities and others to enhance long-termism, forward action and adaptability. Respondents felt that the UN system had lacked a high-level space for futures and foresight, and it would give a focal point for collecting global futures research and assessing strategies to improve the prospects for humanity. Alternatively, it could use futures intelligence networks that already exist to connect specialists, experts, entities that work on these issues and the countries that need this support.

The element regarded as very critical with the second highest number of votes was the regular issue of **Strategic Foresight and Global Risk Reports**. One striking comment made was that this would help to improve the consensus of global elites and national leaders and stimulate future thinking on a global scale. UN Secretary-General Antonio Guterres had originally proposed to present a report every five years, but one respondent pointed out that accelerating change meant that a two-year time frame would be better with an intermediate report every year. (The present writer voted for annual reports.) Another contributor noted that one benefit of ongoing reports was that you could highlight what had changed from the previous report and why and what remained persistent.

However, the element regarded as either critical or very critical that had the highest number of combined votes was the **UN Summit of the Future**. Mr. Guterres has proposed that this be held at the 78<sup>th</sup> session of the General Assembly (in 2023). This attracted many supportive comments. One stated:

“The Summit provides an opportunity for each nation to record its role in achieving a desirable future; these views could be analysed and synthesised for a report by the Office of the UN Secretary-General for a “state of national thinking about the future”, which could then become a focus or benchmark for improvement.”

The serious involvement of key countries could be a catalyst for raising interest and putting policies into action. It could encourage countries to integrate the goals and objectives of “Our Common Agenda” into their national long-term plans.



If this sounds rather optimistic, respondents also realised that at least the opportunity was there to bring Heads of State together in informal off the record meetings with forward thinkers and innovators and try to “change [the] development models of leaders”.

The need to use the Summit to engage the general public worldwide was also recognised. The Summit should be broadcast live with commentators and futurists interpreting what was happening as if it was the Olympic Games. This would increase global awareness of actions to be implemented locally.

The last two elements, the **Special Envoy for Future Generations** and the **Trusteeship Council repurposed as a Foresight Body**, were also warmly welcomed if seen as slightly less critical. It has always seemed to me that anyone dealing with foresight and the long-term was by definition thinking about future generations. But as a speaker who had become a grandmother pointed out at a foresight meeting I was attending whilst in the middle of writing this blog, for her the long term was an abstract, for her grandchild it would be real. Youth should have a greater presence in the profession. The Trusteeship Council, which formerly supervised UN Trust Territories through to self-government or independence, has been dormant since 1994, but as one respondent pointed out:

“The Trusteeship Council can be an overseer of the Summit of the Future results.”

Finally, in response to an open question about further strategies, it was suggested that the UN should set up an Office on Strategic or Existential Threats. These tend to be omitted from national plans as “beyond the remit”.

If these proposals come about, they would push foresight and collective intelligence to the heart of global planning in the organisation responsible for trying to keep the planet in equilibrium. A Summit of the Future in a year’s time would be a unique opportunity both to engage world leaders in this thinking and to capture the public imagination. Without leaders on side and a better informed general public, nothing will happen. Anyone with an interest in foresight should be thinking now about how they could advance this agenda over the next twelve months.

*Tony Diggle is a SAMI Associate and published playwright. He was a contributor to the Millennium Project Real-Time Delphi Study and writes in a personal capacity, published 14 Sept 2022.*



## 10 Headlines from ESPAS 2022



*Image by ar130405 from Pixabay*

Following the recent ESPAS (European Strategy and Policy Analysis System) Conference on 17-18 November 2022 we reflected on what we'd heard. Here are our ten takeaways.

### The Old Order Changeth

1. We have reached the end of the “New World Order” after 30 years – one senior European Commission delegate wistfully mused that they may prove to have been the “best 30 years of our lives”. We now have a Bipolar Europe (and a multipolar world). Bipolar Europe divides between the West and Centre, where individual rights and freedoms take precedence, and the East, where collectivism trumps the rights of the individual. The borderlands between are actual (Ukraine) or potential (Belarus, Moldova, the former Warsaw Pact countries) conflict zones. Everything can be “weaponised”: fuel, food, minerals, people/refugees.
2. Europe is greatly diminished as a global power. It relies on NATO for its defence – and for NATO read America. Although Europe is saying it will take steps to build up its own defences, it's a long way off being a military power. This is a major **risk**. American attention could shift: an “America First” President might be elected. A conflict in the Indo-Pacific zone would draw American attention and resources away from Europe (subliminal message: “*Asia now matters more than you do*”).



3. Europe should have seen this coming. The signs were there in 2014, when Russia seized Crimea and attacked the Donbass; they were there in 2008, when Russia attacked Georgia; they were there in 2007, when Putin said explicitly that the post-Cold War settlement was not working for Russia. NATO took notice after 2014, and began arming and training the Ukrainians. European politicians did nothing effective until February 2022. Oh, and since the invasion, Europe has paid Russia 100 Bn euros, mostly for oil and gas. Effectively we have paid for Russia's war – at least this year – because we ignored the clear signals from the Kremlin and on the ground in Ukraine.
4. Whilst Europe was slow to act, since the invasion last February, it has shown impressive solidarity, and a consensus that Russia must be defeated. But there may be weak links in the chain, especially the German Government, which has been a reluctant supporter, and whose Chancellor recently signalled that he would not support any sanctions against China in the event of a similar attack against its neighbours. Also, in being resolved to defeat Russia, it is important to understand that what would happen in Russia afterwards is anyone's guess: another **risk**.
5. The new Cold War extends to communications: fake news (eg Covid and vaccines), conspiracies (*"the West started the war"*), and use of online communications by repressive regimes to intimidate and silence enemies and dissidents in other countries (eg recent threats against Iranians in the UK). The West needs to get its act together. Russia is making all the running, and China is catching up, and using its wealth to influence communications outlets in other countries – eg taking Africans to China for communications and media training.

## Climate Presses in on Us

6. Don't forget climate! – as one delegate said, "we are walking when we should be sprinting". Another delegate (guess where in Europe he comes from) said that we need to be planning now to evacuate entire coastal regions, as sea levels rise. Europe talks a good game on decarbonisation, but is performing poorly in some areas: in developing green hydrogen it lags behind other regions. Big hydrogen producers – such as Egypt – express frustration that they cannot sell to Europe, which originally encouraged them to develop their hydrogen industries. Asia is moving much faster. In nuclear, the US, Korea, China and Russia are all developing modern nuclear power generators; Europe isn't. Putin's War is an added incentive to reduce Europe's reliance on fossil fuels and on imports of raw materials and manufactures. And Putin apart, Saudi Arabia, Qatar etc may be allies (although that may be changing), but they are not exactly "friends".

## Friendshoring





7. Which leads us on to trade. The “New World Order” put the emphasis on cheapness. The entry of China into world trade was deflationary for 20 years. Now, security and environmental considerations take precedence. Europe, the US and Japan are all investing in manufacture of semiconductors – China controlled 80% of the entire global production: Europe aims to increase its share from 5% to 20%. This will be inflationary. The big buzzword from the Conference was “Friendshoring”: concentrating trade among allies, and reducing reliance on producers we cannot trust. It is important to note that there isn’t always a choice – certain raw materials are effectively monopolies or at least oligopolies, eg copper or cobalt. Another big **risk** there. And much of the World’s oil and gas comes from countries which do not share Western values....

## Making New Friends

8. .... Ah yes, friendship and values. Social research in Europe confirms what we probably all perceive: that there is growing distrust of politicians, and disillusionment with politics and capitalism – especially among younger people. But at the same time, there is increasing support for “emancipatory values” – equal rights under the law, non-discriminatory practices, freedom to be whom we choose to be – again especially among younger people. This may also appeal to younger people in other regions: think of the young Iranians, the young Russians who have fled from Putin’s War, the young Chinese who have opted for “tang ping” (laying flat), and who refuse to work 16 hours a day and have children. It’s a potentially intriguing second front in the propaganda Cold War.
9. It’s intriguing also because there is a Gulf between the West and the rest. One of Europe’s “strengths” has been as a regulator – a prime mover in the rules-based apparatus underpinning the New World Order, which is now in decline. Repressive regimes obviously reject Europe’s traditional values, and it’s clear that other regions are sceptical – we stand accused of cutting down our own forests, but telling others not to; and stripping other Regions of natural resources whilst preaching environmentalism. There is a gulf in trust, which in effect works in favour of unfriendly countries and blocs.....
10. .... So the final takeaway from ESPAS, is that it needs to be less Atlanticist, and more global: it needs more input from other Regions – Africa, Asia, Latin America. It also needs to up its game on science, but that’s for another day.

*Written by David Lye, SAMI Fellow, published 30 Nov 2022*