NEXT 100 EXPERT PANELS

REPORT from panel #1 (April) for panel #2 (June)

Dear Experts of the 2nd Expert Panel,

This is an edited and curated transcript of the 1st panel. We wanted to preserve the flow of the conversation as well as it's development, agreements, disagreements and insights. The speakers are here identified with initials.

The list of experts from the first panel are at the end of this document or on the website here.

The contents table below is just for orientation purposes, the report flows as the conversation did. Note that the "wish list" towards the end, is our 1st panel's answers to the questions:

What do we need to know about the future and don't? If you could wish for a "magic button" that would enable you or your sector to be better, what would it be?

Your role as an expert in the fields of methodology, technology and/or foresight is to

1. **reflect on the outcomes of the first panel (this document and/or video link above) and**
2. **firstly assess what you and your sector/field of expertise and practice can do to contribute, enhance, mitigate, or solve and**
3. **secondly, what your perspective, experience and opinion is on these topics as well as related topics, what is missing and what is most important to you.**

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The next 30 years

1. What are the most likely developments in your area in the next 30 years?
2. What were the key developments in your area in the past that have shaped this issue?
3. What are the underlying assumptions for this view?
4. **What ideally should this area look like in 30 years?**
5. **What are the practical steps to get there?**

HP

If you look at things like food and energy prices and inflation and scarcity, we're moving into an era of more scarcity and more volatility. Climate change is driving some of that and so is rising global inequality and some of the geopolitical flux we see. That scarcity drives socio-political and geopolitical impact, works also the other way around. There are a lot of geopolitical things that are also going to be driving impact vis-a-vis wheat production not coming out of Ukraine, not going to the Middle East, and not being able to be turned into foodstuffs, which is feeding a lot of the developing world. So, this is either a vicious cycle if you can't fix it, or a virtuous circle if you can.

Where we would like to be in 30 years is a world where there is more predictability with less volatility around markets. We probably thought globalization might help with that, it's not certain that it necessarily does with some of the supply chain issues. If we could be in the position we've been in the last 15-20 years where inflation has largely been under control and we've been able to do a bit more planning in that space, that would be a good result. It isn't certain that volatility, scarcity and a lot of these drivers will have a stabilizing effect on inflation either. If we can get to a more steady state, that would be helpful. Technology can probably help us get there but there are other things that can come alongside that.

MB

There's a possibility for technology to help address some of the food security issues that geopolitics are now making direr. This is where culture and politics and policy will come together. There are ways to make more crops more workable in different geographies but then we have the resistance to GMOs and other outputs of technology. This is a time when we really have to come to grips with what it means to increase food security - what are the tradeoffs that we're willing to make?

HP

The challenge for us is less about whether the technology works (it usually does) but rather whether our social, cultural, regulatory, and economic systems are willing to accept the advantages (and potential disadvantages) of the technological advances.

FN

Look at advanced energy technologies such as fission and fusion only. Fission, because of suboptimal reactor technology, and also because it can serve as a breeder technology, has almost become impossible to discuss in politics and society. Even as the technology matures, even as we are getting closer to practically applicable fusion technologies that could help solve energy problems globally, the acceptance of these will remain low.

DK

An issue to be highlighted is the chips shortage because that's what's impacting the robotics industry. A big factor in the chip shortage is because our supply is mainly in the East, in Asia. So what actually happened to that Semicon industry? The question is why was it so concentrated there? Of course, it helped a lot with the cost and with the different industries that industry is supporting, but with what happened, we now see the drastic impact now with inflation and volatility of the other commodities surrounding Semicon. And what do we want to happen? We want to find the balance again. We have to decouple, we have to be more regional now in making sure that our supply is well covered. It's about risk management. If something happens in one area, then we have a contingency. Even though it might cost a bit more, at least it's there.

How to make this less volatile? Not doing single sourcing. So having multiple sources and alternative sources. On the design, you can do design re-engineering of your product in a way that you don't have to rely on a part. You can address the same function but it may be a less complicated part. You can do in-sourcing and manufacture your own. So these things would lessen the risk depending on what suits your company.

30 years from now, we are moving from industry 4.0 and moving toward industry 5.0. And robotics is playing a big role in making that happen so the Semicon industry is very important.

MK

Is it reasonable to expect that Europe can be more self-dependent in the area of sophisticated semiconductors? My take: not really, not in the next 5 years, anyway. If not: what would be plan B?

BF

One of the most important things that we need to deal with right now is trust. Trust in our governments, trust in our corporations, and trust in our multilateral institutions, collectively or individually, to deliver a better future. For example, it's embodied in the UN Sustainable Development Goals and I think right now, there are some very big questions around that.

On inflation: I worked at a central bank for many years and central banks have inflation targets. So a question we used to always ask in interviews, whether to people with Bachelor's degrees or PhDs, is what's your prediction for inflation 10 years from now? And we'd get incredibly complicated answers on theories of price determination and empirical models for how prices are determined and in fact, the answer was very simple: 10 years from now you'd expect inflation to be at the central bank target. But, it's contingent on people believing that the central bank can deliver that target. So that's trust in the institution.

What needs to be thought through very carefully is governance around these institutions, around the technology that we see, and about AI. There are some major concerns about technology's ability to deliver the outcomes we want and it's not the technology itself, it's how we use the technology. We have done some work at CIGI on ways we think technology can be governed. Can be found here.

MK

Trust is very low now, generally speaking, and getting lower. What needs to happen to reverse the trend?

HP

RAND has recently undertaken a large body of work on what we call "Truth Decay", the diminishing role of facts in public discourse. This has an impact on the important trust issues that BF raised. You can access RAND's work in this area here.

IB

We're coming back to an era of stagflation. How long it will last is uncertain but this conjunction we're seeing of growth slowing down and inflation picking up well beyond what central banks have been saying does point to a sort of involatility.

Second, we need to consider whether globalization is entering a new phase. We're not in deglobalization, but it is coming to a new phase which ties into what DK said about industry 4 or 5. We need to map the parameters of that. That, in turn, leads us to the question of what central banks can, and are willing to do because they're changing. If you look at the new (unclear) strategies of both the ECB and the Fed, they're different. They take a different approach to price stability and to things outside the normal remit of central banks, in particular how they view their commitments to climate change. If you put these things together you get a combination of changing underlying factors and accompanying them, different demands on institutions which tie in with what Bob was saying about the need to refocus on how governments are going to work. There isn't global governance. There's G20 which is inept. There's the UN which is even more inept. And you're left with very little which is being done to mitigate or solve some of these problems.

MB

IB's point that "there isn't global governance" is important, although we also have to be careful what we wish for.

MK

I agree with IB that we do not experience "de-globalization" as such (depending on definition) but there are very strong technological, political, social, cultural and economic forces that do point in that direction. My question would be: what are the indicators that would point in either direction? (more, less, different globalization?)

IB

To MK's point: globalization used to be - decades ago - about trade and investment; now it is shifting in various directions (cf Baldwin's idea on what globalization is becoming. We should maybe also raise a general point about whether volatility changes in response to the war in Ukraine (is it economically a structural break) pushing towards strategic autonomy as espoused, notably, by Macron.

CDP

To bounce back on what BF mentioned about technology and trust. Yes, right now we're at an all-time low in trust in institutions and technologies but what we need to promote beyond just blind trust is a reason for you to want to use that technology and believe that it will be in your favor. So, here I'm thinking about for instance AI regulation which the EU has taken a big step in. But, I'd say this is just a first step which still needs to be iterated and can be iterated on by other countries. In a lot of other countries, such as here in Mexico, there is no

regulation regarding AI and that's wildly dangerous. So, with regards to technologies like AI - which we're now seeing being used in new spaces like the metaverse - don't try and just regulate.

The other thing regarding trust being low in companies is that we're seeing very big tech monopolies and I hope that in the next 30 years, that will be different. And that would allow us to have a little more trust. Again, because there's better regulation regarding those monopolies where they can act and regarding just how powerful they can become.

PG

I want to add another big picture consideration to BF's intervention about trust and may be prompted by DK's thoughts on value chains. It seems to me that one of the challenges we're facing is how to reconcile economic efficiency goals with a number of other goals. On the challenges in the value chain space where we're experiencing extraordinary disruptions, bottlenecks, delays, etc. (and there are solutions that present themselves like diversifying suppliers, stockpiling at home, reshoring etc.), these are interesting solutions from an efficiency standpoint, even from a resiliency standpoint. But increasingly, what governments are doing and what they have to do is assess these solutions from a sustainability lens, with a labor standards lens, with a geopolitical lens and increasingly with a security lens. And it seems to me that's where one of our most significant challenges lies because we used to be able to default to the efficiency solution or even the resiliency solution, but I don't think we have that luxury anymore. And that's good, I support that but it creates governance challenges that are really quite significant.

BF

Agree with PG - we now know that efficiency and distribution go hand in hand i.e. we need to focus on both whereas the focus has been on efficiency or growth.

AT

I'm going to be a bit deliberately provocative in thinking about what the world will look like in 2050. A few of the assumptions I'm making, I'll throw out there. One: China is the most powerful country in the world. The US currency is maybe not the dominant currency. We're facing - if the demographers are right - a drop in the world population, which could have profound effects on all sorts of governance issues. The world may be more violent and there may be more conflict than there is now. After the Cold War, we enjoyed a period in which there was a decline in interstate conflict (though there was an explosion of interstate conflict). But, I wonder if the Ukraine crisis and the Iraq War of 2003 signal that perhaps interstate conflict is back.

And I see a massive displacement of people and movement of people - in part because of conflict, in part because of climate change. Some of the predictions are that in 20 years there could be hundreds of millions of people on the move and that will, of course, present huge governance challenges for countries that are receiving people and that the world overall will be more illiberal than it has been in this period of the past 75 years where the West has essentially been the dominant region. So, I wonder if we're moving towards an era in which countries like the US and Canada and Europe are really declining in relative power to the rest of the world.

DH

Fully agree with AT on the more violent and illiberal world… What will this mean for Europe?

MK

DH, thank you for this question and I believe, in many ways, that is in the hands of Europeans themselves: are we going to give more credit more in the "autonomy" direction? Are we going to move away from short-term gains mentality (which led us, among others, closer to the hands of the wild capital of Russians and similar economies)?

MB

CDP mentioned the metaverse and my original thinking about the first question had to do with the evolving future of the internet or the complex technologies that we call the internet, even if they go well beyond networking per se. To me, all the buzzwords that are thrown out today - metaverse, web3 and so on - will coevolve and integrate in interesting ways. It's a topic that I hope to delve into more. And, as CDP suggested, the role of big players remains to be seen and arouses concern. If we go back to the original formation of the term "metaverse" in Snow Crash, that was a vision of the world in which governments shrunk considerably and corporate entities were multinational and ruled everything. So that is one known dystopian future, and we can see where it goes.

But, I want to pivot from this vision of interconnected technologies to get at the migration issue that AT raised. Because we can already see how technology is helping diasporic communities to remain connected. Even as people move away from their homeland, they are remaining connected. And we don't yet know what those forces will mean socially, economically, and politically but they're likely to be intensified likely because of the reasons that AT pointed to and in part because technology allows for this greater connectivity.

DW

I didn't expect the conversation to go quickly to the issue of trust but that's actually really interesting. There are two different dimensions that are relevant, two different bases for trust. One is the quality of a social relationship and that's what gives you a robust willingness to expect somebody to be faithful in their obligations and commitments. That's been in decline for a long time and sociologists have a lot to say about that - it has to do with the decline of social capital and the decline of the tightness or localized decision making groups, the diffusion of life in general in a mobile globalized world. The other part is a decline in the respect for expertise and deference to expertise. So people just don't trust experts any more. And that may be because there are just too many damned experts and you can find any expert you want who has any point of view and you can sort of play expertise tennis and Twitter and so on, which aggravates that problem.

So, if you have these two trends - the decline in fixed social capital and the decline in the respect for expertise - sociologists can't point to any fix. And this is a real conundrum. You sort of extend the trend to see what the world is going to look like in 2050 or whenever, when this problem gets worse and worse, it's going to undermine the basis for democracy. I don't think you can have a functioning democracy if you don't have a generalized basis for social trust and some respect for authority. And so, authoritarian leaders are going to be able to run with these trends because people will defer to authority when it's convenient and when it's easier to do than not to defer to authority and that's a recipe for success for authoritarianism.

We're going to have to get used to a world in which there's a lot more authoritarianism and a lot less democratic decision making. I don't know where that leaves the experts.

AT

Another worrying trend is the proliferation of nuclear weapons, and the development of tactical nuclear weapons.

MB

Per DW's point about declining respect for expertise, see here.

BF

To DW's point - the issue is trying to figure out who is an expert - especially given amplification algorithms of the platforms.

CDP

In terms of authoritarianism, we're definitely going that way. States - especially the most powerful states, like China and the US - are getting more data every day and that is definitely something that is going to lead to more authoritarianism. It is something that is a more dangerous game where beforehand, governments used to have different institutions to take care of different aspects of services and life but nowadays, thanks to data recollection, it can be centralized and that's just a recipe for authoritarianism.

In terms of where we're headed, when I talked about technology earlier, I talked about regulation and I'd love for that to be where we're headed. It's very important, but if we look at it in the context of the race with China, the race for power, I wonder if going towards regulations is actually something that could make China more powerful because that's not something they're going for. China is one of the main creators of technology - including WeChat, Baidu, Alibaba - those are all technologies which are capturing data in different countries. People talk about data imperialism, but I'm not sure that's the term I'd want to use because it comes with the whole historical baggage, but more so, it's about the fact that they're just amassing incredibly large amounts of data. The lack of regulation or I could say ethical concerns maybe, also will allow them to move forwards much faster than the Western world which IS concerned with ethics and regulation.

There was a story about the Crispr twins that was just all over the news a few years ago. And, recently there was an article that came out about how China is looking at the metaverse as an area or a digital world where they can explore tactics for war, the military and how they would have to organize.

So, I do hope we move towards regulation, but I wonder what happens to countries who move faster and who don't care for that regulation so much and is it in our best interest, yes or no?

IB

Intriguing to note that no-one has yet mentioned covid as a driver of volatility. I suspect we have yet to identify its long-run transformative effects. Here are two possible examples of things that might be systemic changes that we ought to take into account when considering volatility. Consider two (advanced country) examples: will city centers recover their roles and their extensive linkages, or will work from home persist; and will business travel ever revert to what it was, now that we all use a certain app called zoom so extensively?

MB

Per IB's comment, it will be interesting to see if preparedness (for future pandemics) actually takes hold or if, once Covid subsides, we revert to being more reactive.

DK

Agree with above regarding preparedness - How are governments revisiting/preparing/testing their business continuity/disaster recovery plans taking into account what happened during covid?

JS

I've been thinking about all these aspects and how they'll come together with government financial stability moving forwards. If we think about developments with the metaverse, the aforementioned structural changes, covid impacts on debt loads and a taxation system which is already recognized as not being up to 21st century challenges, these issues combined call into question how will governments finance themselves moving forwards? Where will the revenue generation come from? Capital growth has been much faster and much larger over the last 40 years than income growth and we have stagnating and declining populations in Europe and the US and elsewhere. We've talked about regulation and the other aspects, but we also need to examine whether governments will have the ability to finance themselves, and to take action in a world where their traditional sources for income are in decline or under challenge.

BF

And big questions about fiscal and monetary policy mix.

AT

This is maybe a question for BF, but how might the massive deficits from COVID cast a shadow over government decisions/policy going forward?

BF

It creates enormous issues domestically and internationally. Internationally, we need debt relief for developing countries but China is not part of the Paris Club. And there continue to be disagreements on how debt relief should be done, e.g. Argentina. Domestically it goes back to points raised by JS - fiscal capacity, how to deal with rising private debt, increased concentration of wealth and how to redistribute. One way out is to grow the capacity of economies but not clear whether the conditions yet exist to boost productivity growth. Also need to address rising corporate power - good to see more focus on anti-trust but will also require regulation.

HP

Going back to the regulation point because I am less convinced than CDP. This is not to say that I don't see a role for regulation. Particularly if we are worried about authoritarianism, and authoritarian governments start driving the regulation, I'm afraid we'll be in a worse situation than when we started. So, there is something about, are there some wider norms, societal norms, that one needs to be applying in this context. I suspect this group could come up with some of them. There may not be a universal agreement but it would be quite an interesting way to think about that.

The other point where I would agree with CDP is that there is a real risk with the accumulation of data that does potentially mean authoritarian states could take more control and exercise more control over their citizens,

which is problematic. But it's not just governments that are collecting data; it's corporations and others that are collecting data too. And I would argue that in a lot of our advanced Western economies, it's a lot of the big corporations that know more about us than our governments know about us. They know how to market things to us, they know how to get us to do things our governments only dream about frankly. And that, in and of itself, is also slightly scary and perhaps gets to MB's dystopian metaverse that you so eloquently referenced earlier.

IB

One of my colleagues once made the point regarding data that in China, the state owns your data, in the US companies own it and in Europe the principle (if not always the practice) is that *you* own it.

BF

Important role for standards but these are dominated by firms and jurisdictions that also impose their own values in the uses of technologies, e.g. China and facial recognition technologies - though there are moves to be much more open and multistakeholder.

MB

Facial recognition is an application where China leads - in part because there has been a broad and deep effort to excel in it within China. Such R&D coordination is harder elsewhere, within the US and Europe let alone between them.

FN

With any new technology at some point, as we heard before already, comes regulation and that's important. So for quantum computing, well quantum technologies in generally but especially for quantum computing, it is important that we look at how to regulate the technology since one could argue that the most important invention of humankind was the computer and now we're at this next stage of evolution in computing, in quantum computing and if developments proceed, as we predict they will, then this doesn't follow an exponential law, it follows a double exponential law, that means the technology will mature faster than we expect. I know for the last decades even, quantum computing and the applications that quantum computing enables have been always ten years away but this is not the case anymore. So now, we're seeing real-world applications already today and it's very difficult to predict what's going to happen in 2, 3, or 5 years and if we think further, then everyone, I'm sure in this round, is thinking about the positive applications. We can create new materials, we can develop new drugs, and we can simulate quantum physically how a new drug reacts or how a protein reacts to a drug.

But there are also other applications that are security threats, such as the potential attacks on all currently used encryption standards. For example, there is theoretical proof that with a quantum computer strong enough we can crack these algorithms and that concerns all network-based communications, that concerns telebanking, communications between vehicles, and any devices that communicate with one another, all are potentially under attack. This is something we really have to start worrying about and we have to think about how to regulate that technology. Because in the worst case, you wouldn't even notice that someone has been able to decrypt all communication that is going on on the internet. We heard about China before and about China becoming the most powerful country in the world and I'm very careful about painting someone as a particular kind of actor but I would say it's very opaque what's happening in some countries and maybe some countries are already

further ahead than we assume and that we know. So that's what we have to really look into these things and regulate and also foster research and also to be aware, so to say.

MB

Per FN's point, quantum computing presents a paradigm shift - it isn't simply "higher performance computing" but a truly different approach that can benefit application domains of different kinds.

CDP

To respond to what Hans said, one point that we haven't touched upon enough is that authoritarianism in the West could also look like companies, big tech companies, taking on a lot of roles that usually the government should have taken on. And also how they can shut us out of those social spheres. One of the easiest examples is Twitter which banned Trump. So what happens when you can be banned from these social platforms which are key for interacting with other people? And Trump is an extreme example but there are other cases when they've tried to regulate bullying or harassment online and that just ends up locking out certain communities who use language in a different way than the ones who designed the algorithms. and also there's been cases on Airbnb where people have just been locked out of the platform so these platforms have their own governance, no one has a say in it, we use them all the time, so if these companies can just ban you because they feel it, or because their algorithm did not consider you, then where does that leave you? And how does that really create an inclusive future?

HP

Thanks CDP. These are all really important points about non-government control and censorship.

DW

To echo FN. This to my mind is the big development that's coming down the road. Encryption is toast. So unless we can figure out some way to do quantum encryption to counter quantum decryption, we're all in a lot of trouble there. Combine quantum with AI and can you imagine the speed at which automated systems are going to be making decisions that affect every aspect of our lives? It's just mind-boggling. There may be some upsides. So a combination of quantum and AI holds the promise, theoretically of helping us design containment systems for nuclear plasmas which would actually make civilian nuclear fusion possible, which would be an enormous breakthrough on the energy front. So upsides and downsides but it's hard not to worry about the downsides.

MB

People are working on quantum-resistant encryption - how well it works and how fast it can be implemented are key unknowns.

AL

On FN's point on technology and on how it can be used in the future and be careful about the future we paint. And I just wanted to speak about the nexus of geopolitics and tech which is the area I specialize in. One of the dangers I see is a growing disconnect between theory and observation or misdiagnosis or even over-inflation of the role of technology's potential impact. For instance, something we've seen very clearly over the last couple

of weeks, for those who have followed the media coverage of the war in Ukraine, you would be forgiven for thinking that cyber has played no significant role as most outlets in the media have run titles along the lines of "where is the cyberwar?" or "the missing cyberwar" and it's because many commentators expected a cyber Pearl Harbor in many ways in the context of the Russian invasion of Ukraine, they expected a lot more disruption and the unprecedented (unclear) shock and all the debilitating effects. The fact that this hasn't happened, instead of leading people to reassess or evaluate the blueprints and the theories that we've previously entertained about cyberwar or the role of cyber in warfare, has instead led them to double down on "this isn't cyberwar" or "this isn't what cyber conflict looks like," instead of looking at the evidence which says that we've seen a relentless, grinding conflict (unclear) whose cumulative effect has been very disruptive to the Ukrainian population.

One of the things we have to be wary of is that we need a clear-eyed view of issues, based on practical observations and we shouldn't be complacent or naive. But also, we shouldn't indulge in scenarios or thought experiments which are entirely disconnected from practical observations, especially if we want to ensure that policymakers and analysts are prepared for what comes ahead.

DH

So we're speaking about the trends and drivers that will shape our world in the next 30 years and I wonder what they will do to liberal democracy? And what will it do with Europe? If I could dare a guess, I'd say in the next 30 years we will see the United States of Continental Europe. Out of necessity, under pressure, Europe will grow more together and will try to find European solutions to the issue of regulation and how to deal with technology, and how to deal with the issue of privacy, freedom, individualism and so on.

The question for me, and for our foundation would be: will this be a mostly defensive project where Europe wants to defend its values and what it already has? Or, will there still be room for a lighthouse? A shining light, a European light that will try to inspire and influence other parts of the world. That for me is a really tricky and intriguing question. And, whether we can avoid any neocolonial arrogance in being such a light and whether we in Europe can refrain from giving in to the authoritarian temptation and the way it makes things more efficient and perhaps is often easier than doing it in the messy democratic, liberal European way. And finding a way to use this messiness as an advantage, will be a key challenge for us in the next 30 years.

MK - GARI

On the drivers for the next 30 years and where we would like to see the global order in 30 years. Starting with the second part, it's quite obvious that we would like to see a less unequal, less environmentally challenged, less politically fragmented and unstable world with protection of the cultural idiosyncrasies. This is generally where we should be heading, to put it in very simple terms.

However, the trends that we're seeing now are more political and economic autarky, and more digital autarky (we can see this in the war on Ukraine). We see more wild accumulation of global capital, more political fragmentation, both within societies and among countries, more negative effects of technology on societies and we see movements towards a less economically interconnected world, even in terms of the supply chain.

I'm not trying to paint a negative picture, I'm just trying to spell out the trends against the ideal scenario and they just go against each other and my question is what can be done in practical terms? For example, if we

managed to get the president of the European Commission, Elon Musk and Joe Biden in September to Canada and we all had one particular point that we could ask them to do in order to change things, what would that be?

IB

To segue into energy: the big question is where the acceleration of supply-source change triggered by VV Putin will take us: let's say gas consumption in Europe halves in the next year, and there is a serious push on renewables, then established energy trade flows become very disrupted.

DW

In case people are interested in the energy/conflict nexus, this just came out today.

And also on space…
DK

To bring in the topic of the space industry. In the next 30 years, it will really gain more traction as we talk about sustainability and looking for other sources of energy, starting to build life on Mars. It's more of a question of when should the space industry start engaging with other industries, like basic industries, so they can prepare for when we are ready to go to Mars so you would have the water industry, oil and gas etc. to start things over there?

MB

On DK's point about an ambitious goal that is obviously down the road in time and what it takes to get there - getting to Mars is certainly something more demanding than some other expectations for 20-30 years from now - makes for a good thought-exercise.

FN - on energy

Regarding energy: As we all know, there are lots of developments happening in the energy sector, even old technologies such as fission reactors, and fission technology. There are new developments that are happening such as molten salt reactors for example. So all these, plus fusion reactors so for example (unclear) being one of the most prominent approaches here, all of these approaches really have great promise to solve some of the energy problems in the world and to contribute towards solving these.

Of course, we also need sustainable energy to make this transition away from coal and away from fossil fuels which won't happen overnight. There are a couple of things I see as challenges for moving on. For one, everything that has the word "atom" in its description is considered to be bad. At least, that's my feeling. For example, fusion and fission technology are politically dead already. Fusion hasn't even started and it's already difficult to sell even though the promise is so big. There are a couple of reasons for that, like the disasters that we saw with fission technology in the past, that these technologies can serve as breeder technologies, so you can use nuclear waste to build dirty bombs. So this is something that has to be regulated which makes it even more challenging to get it into practical use.

And then there is sustainable energy, so there is solar energy that is of course being discussed and that has to be implemented worldwide but that is something that doesn't happen overnight so we need some sort of transition

so in my point of view we need fusion and fission technologies to serve the energy needs of the world in this transition phase. Because this switch to renewables will take some time and it takes new technologies that have to be developed, new approaches such as satellite or space-based solar power and that is something that doesn't come quickly. And that worries me a little. Right now we have a strong discussion that's leading us to renewable energy but how to get there? It's not just about turning on a switch.

Transcription Panel #1 - part 2 (46:50 – 1:25:00)

JS

Will there be a new Carter Doctrine for resources necessary for 21st technologies?

The Carter Doctrine relates to the 1980s when they said that the US will protect oil and gas-related interests in the Persian Gulf and is also for global supply chain issues.

MB

Regarding JS's point about whether one needs to operate in an area given its resources - in addition to the US example of the Carter Doctrine, one can also look at China's expanding network of global points of presence.

AT

Will international law matter in 30 years?

HP

On Florian's point on fission and fusion. There's certainly a lot of discussion in the UK at the moment around small nuclear reactors and how that may be a step towards getting us there. Others probably will know more about it than I do but, it's certainly a technology which is creating quite a lot of discussion here. It'd be interesting to get people's views about that either for the long-term or as a bridge. Somebody just mentioned this, but to continue with the bridge, one of the things that one thinks about renewables is that the sun doesn't always shine, and the wind doesn't always blow. So, there's something about energy storage and some of that's around battery technology but it may be around wider capacitor issues. So, if you're looking at areas where technology can really help us in the energy transition it is also about large scale energy storage and distribution and how that would work. It's probably an area where social, regulatory, or cultural norms may not work quickly against us.

Then maybe the last point which moves us a bit off energy is understanding where some of the path dependencies around supply chain vulnerabilities are. The war in Ukraine is a good proxy example for all kinds of things. We see energy shortages and how it's going to get replaced but then there are also things like how Ukraine is no longer able to export all of its wheat. Ukraine normally exports huge amounts of wheat. They're the third-largest exporter of wheat in the world but they don't export that wheat uniformly to all countries of the world. So, there's an understanding that when you have some of these issues of scarcity or geopolitical conflict, where is it in the global supply chains that are going to get hit hardest by particular conflicts? It's going to be very bespoke and very individual depending on where the conflicts are. However, being able to have systems that are able to pick that up and understand where those specific vulnerable areas are will be really important because otherwise we may have another Arab spring and we're not ready for it. Why did we have the first Arab

spring? It was because food prices drove it to start so thinking about some of those path dependencies in supply chains is quite important.

MB

To HP's points on path dependence, especially w/supply chains, and on the need for energy storage since, as he said, the sun doesn't always shine and the wind doesn't always blow, basic realities that renewable advocates often seem to ignore.

TCP

To HP's point about storage and nuclear and these other technologies, the marginal cost of fossil fuel are so low and that globally we are the energy addicted species and we are going to use up all the cheapest sources of energy and the only way in which we're not going to get through all that Indonesian open cast coal, all the Middle Eastern oil, now the Ugandan oil, Nigerian oil and, the Mexican oil is if we get technological solutions whose costs are actually cheaper than the fossil fuels. In some cases, those are incredibly cheap so all it takes is gas prices to rise, not even to the level that experts tell us is the marginal social cost of the emissions of the gas for China to start burning Mongolian open cast coal again. If we're serious then we have to be thinking that it is all in storage technology, in nuclear- if we really can get those costs down to very low levels- we're talking $20/barrel equivalent oil. This is the cost it has to hit, not a cost that includes the marginal social cost of carbon because most of the world will not be prepared to pay that so we need to have this focus on technology, storage, nuclear and we have to start thinking about the back-up solutions in terms of climate engineering because again that's something which can be done unilaterally and would be a counter to all the fossil fuels being burnt.

MK

To TCP's point, are there any authoritative sources on the ability of societies to withstand the future pressures (social, economic, climate, energy, inefficiency of government institutions etc.)?

HP

To MK: RAND is doing some work at the moment to model economic fragility with respect to conflict, etc. it might shed some light on the issues you raise.

JN - on "Keeping the Lights ON"

I am optimistic that in 30 years, we will have solved most of the current problems but let me take you to the depth of despair for a moment just so you know I'm fully aware of the problem.

Since the 1990s alarm bells have been ringing on the climate threat question. The idea was that the destabilization of the Earth's functioning machinery was really at risk, that an existential threat was imminent and action was necessary. Clearly enough, the Paris Accord was born in 2015 and yet you can ask what is at the core of the climate change problem that has not allowed us to make much progress on decarbonization globally at all. Why has our collective so-called human ingenuity and capacity for innovation not provided us with the kind of tangible results that one would expect? Tony hit the point on the head when he said that fossil fuels are cheap. They remain at the heart of the global energy system and are the historical legacy of the trillions of dollars of investment in this system. This system has created a dependency that is the equivalent of literally a monster holding you in an unyielding grip but it's only half the truth to say that fossil fuels are indeed cheap

because they are not. If you internalize the external harm it's doing to the environment, this is the social cost of carbon. The absolutely massive subsidies through the entire fossil fuel supply chain that exists, make it in essence cheaper or at least from a perception standpoint cheaper. So, I'll get to the point if you need me to elaborate on that much further but here is the depressing part before I take you to what's optimistic.

Before the first IPCC, the share of fossil fuels in 1990 was 85% of the global primary energy demand, the rest being hydro, nuclear and other sources. Three decades onwards, 26 COP meetings and 5 IPCC assessments later, the share of fossil fuels in the current global energy nexus-what do you think it is? 85%. We have not moved the needle by an inch and so here is the paradox. Yes, fossil fuels have essentially delivered what ostensibly would mean massive wealth to the global system but at a much higher level of harm that we have not internalized. So, they're cheaper but they're not cheap and we need to be very careful when we get sucked into an argument which says that other solutions are expensive and so forth.

Now let's look at the current geopolitical crisis with the war in Ukraine. The risk of energy security has become a more powerful driver for world leaders than the future of the planet 30 years from now. With all the noise and attention that the climate scientists have tried to bring to the table, it seems that Putin might well have done us a service by bringing the whole question of energy security right into the middle of the agenda were things that were unsaid or could not have been said in terms of the shift in German policy around energy, Russia, gas trade and so on changed in a matter of weeks. What we have is an unintended consequence of this war that will lead us to a much more positive place. I hope that any exaltation by all those who say that we need gas and to sign up and build more liquified natural gas (LNG) facilities realize that those are poor investments to go down the path in the current system. This is the time when you need to make the investments to literally step off fossil fuels whether it's gas, oil, or coal. This is where we need to go.

Prices provide us with an opportunity to completely rethink where we need to go in terms of the next set of solutions that are relevant for ensuring that the environment remains sustainable and that you are actually able to deliver a level and quality of energy service to the people that maintain social well-being and reduce conflict and so on. Now, I can go on with the solutions, but I've spoken enough.

BF

It would also be helpful if the negative externalities of fossil fuels were actually internalized!

TCP

To JN, not only has the share not moved, but energy consumption has massively increased - so in fact much worse.

IB

One potential direction to explore is the need to understand better the distributive consequences of all we are talking about. Who are the (new) winners and losers?

MK - GARI

1. If you feel that Europe is becoming a digital and technological colony?
2. If you fear or see the trends of the sort of digitally divided world, some would call it a splinternet while less culturally sensitized people would call it the balkanization of the internet
3. Whether you see or fear trends towards something called a parallel digitally organized society which is out of reach of the governments. It will be exceedingly difficult for governments to reach into parts of that parallel digital society, so these aren't challenges but questions.

TCP - on "Digitally Challenged"

I'm just going to make this about digital governance and more specifically data governance because that has become an absolutely central question of where are the risks and opportunities in this area. So firstly, from a high-level perspective, the arrival of very large-scale data plus the computing power process plus AI techniques etc is a social transformation on the scale of gunpowder and it has enormous power. It has the power to do wonderful things like firework displays and helps us build roads. But it also has the power to do terrible things as well. It's enormous and it's transformative and, to my mind, the second great public policy challenge apart from climate change that all of us now face.

The challenge is how to make sure that the power that's encapsulated is used for public good. In global terms for over 30 years it has seemed to me that there are three, possibly four, models that are going to be pitted against the other. At an extreme end we have a Chinese authoritarian Orwellian model of the data commons. I'm not sure whether we'd even call it commons but nevertheless it might work. All those arguments of the 30s about calculation and planning no longer apply and it may well be that the data revolution strengthens the authoritarian model. We have what we might call a Silicon Valley model which is essentially corporate control and the great risk of corporate control over data will be its underuse. Google only really wants the data for one thing which is targeting ads- well, actually it's valuable for an enormous number of things. There is a European model, which is where my question over whether there are three or four models comes from, that has at its heart questions of use control and human rights. Now, the question is going to be - can the citizen control, human rights model of data and digital governance deliver the degree of data use that we need to make use of in order to take full advantage of its power? At a high level, the extraordinary thing about this new resource is that it's got essentially zero cost of reuse and therefore, within the constraints of privacy and of anti-authoritarianism we want as much use of it as possible. The great challenge is going to be in creating the institutions which both permit citizen trust and empowerment in all sorts of collective business and government uses. I believe that it's possible to create those institutions and those models and the next 30 years is going to see those three broad models tested against each other. I know which one I hope can work. The one based on citizen control and human rights.

MK

Great point on the under-usage of corporate data. Any parallels in history (different commodities, different goods)?

BF

UNSG has noted that how data is used is essential to reaching SDG… lots of discussion about non-rivalrous nature of data but main issue is that data are excludable for many reasons - and need to deal with excludability - via reexamination of IP laws, via competition policy, via skills development and importantly better governance nationally and internationally.

MB

The point that TCP made about data reuse and the recognition of privacy - is the only real option is to keep doing R&D for privacy-sensitive technologies to work with because the classic privacy advocates concern about reuse is mission creep and yet while I could argue that corporations like Google do not only want to sell ads because they do recognize the value of the data they've collected and the potential to reuse it. You can look at their evolving application set they have monetized but also built up a larger user base because they've done useful things. So, the solution there is privacy sensitive technology.

On MK's point on whether the EU could be a digital and technological colony which strikes me as a radical thought. I would say that I've been talking to people from Africa lately and they have been promoting the idea of 'AI decolonialism' so perhaps those of us in the northern hemisphere might look to some of what is emerging from the Global South for ideas on how to deal with whether one is a colony or not.

On the parallel digital society: We went through some thinking like this in the 1990s when people talked about internet exceptionalism, and talked about being removed from terrestrial conventional law and policy. What we learned by the early 2000s was that the existing regulatory regimes are pretty robust and extensible so although I'm sure we will end up with short-term instances of evasion of legal regimes. Those regimes will catch up and find people wherever they are.

TCP

To MB, regarding privacy, re-use solutions are not only technological - they are also institutional. for example, data unions that become trusted custodians of data.

My take on MK's questions:

1. We are all in danger of becoming digital serfs; we need to get democratic regulation right to regain our freedom.

2. Splinternet - inevitable, given its power and challenges to the state.

3. Will web3 make "independence for cyberspace" real? No people live IRL, so we can regulate.

MB

TCP's third point aligns with the last point I just made, and I agree that splinternet presents an enduring challenge. I am less certain about its trajectory, though.

BF

Please read the Digital Economy Report from UNCTAD which covers many of the issues mentioned here. Although it takes a developing country perspective the analysis and discussion is relevant to all countries and jurisdictions.

DK

I like what Marjory said around continuing innovations on data privacy solutions. Also, in any technological innovation, my view is there must be some sort of governance - especially if the technology is disruptive - on making sure that a risk assessment is performed to address the question of "what can go wrong" or "how can this technology be misused" from a security perspective.

CDP

Technology “decolonialism” is a particularly important topic in the developing world, where we seek to create products that make sense to the conditions here, look to generate data from our countries which represent the diversity, and refute the hegemony of US Tech companies capturing all the value of our data (referred to as tech colonialism) - but the reality is that the services offered by those companies, with years in the making and built with infinite insights from quantities of data amassed over decades, most likely outperform anything that can be developed in the moment. So in this sense, it's a real dilemma for developing countries.

JS

We need to consider the role of space, militarisation and regulation of the use of space. Starlink and other satellite operators are quickly expanding internet access globally.

AT

Since the mid-70s there have been 4 major paradigm-shifting events and maybe we’re in the fifth now with the Ukraine invasion. But the first one was the end of the Cold War which nobody saw coming. Then it was September 11th and then the global financial crisis and then COVID and now maybe Ukraine. It strikes me that every 10 years there is a major black swan and OP mentioned the idea of taming black swans as the working title for the book project that we want to do and maybe those major events are happening more frequently now than five years ago. Obviously, we don’t know what the next black swan might be that may have a profound effect on the direction of the world but I guess my question is - are there ways that we can better anticipate those black swans and maybe that’s a contradiction because black swans are something you don’t predict necessarily. They come out of the blue and they’re only obvious in retrospect but part of the excitement of this project is that we can imagine potential major events that will have a profound effect - maybe it’s a technological breakthrough, maybe it’s a global pandemic.

Many international affairs scholars were saying that the thing that would bring the world together would be a major global pandemic and that if we were going to have better international cooperation it would be a pandemic that would do it. The assumption has been proven to be quite wrong and so the second part of my comment is if there is a major event you know we are capable of working together to solve it.

MK

I am afraid not "maybe Ukraine", it is a breaking point in many ways.

And to some suggestions of solutions…

PG

Within the space of global value chains, and more broadly deglobalization, a solution has to do with what we're talking about and who's talking to whom. With global value chains, one of the things we're grappling with here in Canada is getting the people who are thinking about the economic components and the security components of value chains to speak to each other. On the deglobalization question, like IB, I'm not persuaded by the deglobalization trope. The solution I would advocate for is a conversation about innovative re-globalization because the equity part is not prominent enough in these conversations. For example, within the domain of trade, in the European Union, we are increasingly getting trade for all. In Canada, we've got inclusive trade. In the US, we've got worker-centric trade. This suggests that some of the base assumptions underlying trade like 'is aggregate gain what we need?' are in question, but it's still not enough to get us to an innovative re-globalization so I'll throw that out as a move toward innovation in my space.

DK

To PG, I am interested to know more about what constitutes "innovative" deglobalization?

PG

Innovative reglobalization! A version of globalization that doesn't leave so many behind since those who have been left behind have been part of the challenge of the rise of authoritarianism and the loss of trust.

AL

It's a concept that was long lamented by the French, which is no longer entirely accurate, and when you bear in mind the European Commission on volunteerism in terms of data protection, digital taxation, artificial intelligence and recent initiatives that we've seen from DMA, DSA to the European Destructive Initiative to Scale Up Europe which is billions for the tech ecosystem, it's just showing that progressively used digital sovereignty ambitions are being showed up and we should definitely be engaging in a peer-to-peer position with the US on these technology issues including an EU-US trade and technology council vehicle.

BF

What we need, to pick up on what PG said, is better coordination among our policymakers. For example, when making trade policy they don't talk to people about labor market policy. Trade displaces workers and it's always been the case. It always will be the case. So, you need to put in place programs to help the displaced. Of course, there are different countries that have different values, however, within our governments, we need more of a horizontal approach to policy. This is particularly true in the digital era.

PG

To your point, BF, worth noting that the China Shock researchers eventually came around to observing not just that competition with China dislocated US workers, but also that the US government did not do enough in response to the dislocation.

BF

The so-called Washington Consensus at the time.

TCP

We don't know how the politics will turn out - we have lots of great policy ideas, but we get tripped up by being unable to build the coalitions for them.

What do we need to know about the future and don't? If you could wish for a "magic button" that would enable you or your sector to be better, what would it be?

OP - GARI

To forecasting now. If you could come up with a wish list to leverage technology, not just Big Data and AI, to inform trends analysis what would you want to know? And then how confident you would be in the results of forecasting that was created by technology in your issue area. And how much qualitative knowledge and expertise for the subject matter do you think that the people that work with forecasting and work on the side of technology need to know? Or is there a collaboration that could exist between your expertise and their expertise that would work and that wouldn't necessarily necessitate them to be an expert in your area?

MK - GARI

I once had a seminar with my fellow pilots and the instructor said 'if you can imagine a button in the cockpit that would make your pilot life easier and safer - it's a button which is not there yet, but you can imagine it's there - what would that button be'? In fluid fields like economy, sociology, political sciences, or security, it feels more difficult to come up with an answer to this question, so I would like to encourage discussion on what the future holds, and what would the magical, but realistic, button be?

MB

In terms of things that we don't know and possibly cannot know, first it would be great to know what the breakthroughs will be. If we go back to that conversation about quantum, we know that some breakthroughs are happening, but we don't know when we'll get quantum-resistant encryption for example. Another related point is that we'd like to know more about how technologies can be combined. A lot of innovation is all about combining technologies so what are the recipes that will work and that will come to bear

DW

MB is right about what the breakthroughs are and when they will happen. There's more uncertainty about the latter than the former and we can do a better job imagining the breakthroughs, but timing is key. That's a huge

variable and the other things that are essential to know are the future demographic profile and the future energy profile. Those profiles drive an awful lot of other things.

MB

Per DW's demographic profile in the future - the global population has been aging, especially in the Northern hemisphere. How will today's youth culture adapt?

CDP

How important is responsible AI going to become? We're talking a lot about AI but what about AI ethics without considering regulation? In countries where there are no regulations, are companies and governments going to realize the importance of it?

TCP

This may reflect my particular experience over the last six years (UK Cabinet Office), but one of the big things that we don't understand as policy people is the politics of all this. We find it very hard to forecast whether we're going to be able to build effective coalitions around what are technocratically sensible ways forward.

MK - GARI

1. Is there a breaking point of society, be it the Global North, Global South, Global West, or Global East, when trust will simply become too low (given all the pressures that we've been talking about)?
2. Can we somehow anticipate that breaking point?

After COVID, which is not over yet, we'd expected that the Russian invasion of Ukraine would make Europe much more vulnerable and prone to compromise but it didn't. It might happen in the coming months; this is a very fluid situation.

3. But is there a breaking point or not? And what insights can we get on that?

TCP

Trust and breaking point is central. The concept we don't understand or model well is legitimacy.

HP

Where is the great power competition going to go - particularly vis-a-vis the US and China? How does the EU play there? They're a third axis, so do they go one way or the other, and how will some growing economies India, Brazil and others play into that more broadly? On the other end of the spectrum, where will corporate control and competition go? This goes back to the point that CDP was raising earlier around how much global influence corporations have posed to nation-states and what that balance looks like.

BF

Total factor productivity is the combination of all these things and that we can learn from the past. The incorporation of ICT technologies takes a lot of time, and it takes a lot of things to happen to allow the technology to get embedded and that's going to be true for AI and big data. To harp on a point on AI and big

data, it's the governance around the use of those technologies that's going to be critically important both domestically and internationally. The UK's Economic Resilience Panel proposed a data and technology board - which looks a lot like my concept for a digital stability board - that's one proposal on how to put in place international collaboration around the governance of digital technologies.

DK

What will the labor market look like with all the developments on the technology side - AI, robotics, digital? Do we have enough resources to sustain that kind of fast development? What about traditional jobs? What if we come to a point where there's so much dependency on automation or robotics and there's another disaster? Then suddenly we don't have the people to do manual work, for example.

AT

On MK's point about the breaking point of societies, what will be the breaking point for our institutions that deal with human movement? Institutions that deal with either refugee protection or migration of people because those systems are quickly becoming overwhelmed and when they do become overwhelmed, there will be a lot of chaos.

BF

The World Refugee Council has done lots of work on this.

TCP

Agreed with AT on human mobility… a bit of pessimism on climate change makes this a very real worry.

PG

The button I would like in my area of trade is to know what values and commitments will actually animate the policies of governments in 30 years? In other words, is this moment of inward-looking economic nationalism taking multiple forms the new normal or will this turn out to be a blip?

MK

I am hoping for a blip, but fear it is fundamentally structural.

AL

Something I'd like to understand or get a sense of in my field is how competition over the global commons and outer space is going to play out, and how data will be able to help us manage high levels of uncertainty in terms of satellite collisions, debris, and the mega-constellations that we're going to see.

DK

Regarding space, clearing the debris!

DH

What I would like to have in my cockpit is a storytelling button because we all must use fewer resources, less water, less energy, and less plastic. How can we tell this story so that it does not sound like a loss but perhaps as again? How can we tell the story?

TCP

I love the "tell me our story" button.

HP

The button I'd like to push is, how we drive digital transformation across the globe in a way that's equal and fair and doesn't drive greater inequality but drives more equality. And that may also mitigate some of the migration, conflict, scarcity etc.

BF

I would like a button that brings various stakeholders into discussions where they are being excluded and where they can provide valuable insights.

DK

I'd suggest an eco button. That is like in washing machines where there is an eco button or a slow travel button. Essentially, a more sustainable way of traveling, if you're not in a hurry and maybe use less fuel consumption - it's more eco-friendly.

JS

I have two questions. One is related to our increasing reliance on space what vulnerabilities does that lead to in a global economic system and are we prepared for that? Increasing satellite-based communications and satellite-based internet around the world. The greatest Achilles heel for US strategic engagement globally is its satellite networks to position its military. With events like solar flares and threats posed by space, and space debris, how is that going to be dealt with and mitigated and what potential vulnerabilities or black swan events could come from that, that would impact us? And how prepared our governments for dealing with that?

Secondly, how do people sense-make this? Global populations, identity formation and loyalty… We've talked a lot about trust - trust in institutions and social capital - and people are seeking alternatives. How does that form and where do loyalties in the future lie, particularly as we're getting new ways of mediating our experience through metaverse and things like that so, is a nation-state the ideal format? It's been a long ongoing discussion, but how do populations sense-make this and where do loyalties emerge and what does that mean for the future stability of societies?

JN

One: New wealth creation that delivers on the principle of equity because if we can solve that, that might undermine a lot of the pressures that enter geopolitics. Somehow the wealth created in the last three decades has not been delivered equitably to the global population and that's where you see the stress points emerging through far-right movements and others.

Two: Sustainable development, specifically the material requirements. This whole notion of use, reuse, efficiency, and use of critical resources, materials, minerals etc. along the lines of EST principles. But, done in a very effective way that would take the pressure off in terms of raw material extraction in all the conflicts that arise because of the geopolitical aspect of who has the resources and who doesn't have the resources. Focusing very seriously on a circular economy might take the pressure off some of the other manifestations of conflict.

Deep electrification of the energy system and digitalization of the supply and demand are solutions that need advancement in governance and regulatory developments.

MK - GARI

From the perspective of what we do at GARI, I would very much like a button that would help to de-commodify data and that would help tackle the issue that TCP spoke about which is the under usage of corporate data and the ability to pool and access data and democratize Big Data.

And to some assumptions…

MB

As somebody who has used and even tried to conduct market research for decades now, I would be the first to say that regardless of the technology available it's always been somewhat iffy. And once you add in Big Data and some of the contemporary tools, there is a risk of maybe making too many associations given the difficulties the technology available has for proving causality. But all of those concerns aside, we should be able to find ways to use data better to understand more latent and less visible trends and certainly, if you look at different kinds of Big Data and AI - let's say in the medical or life sciences realm - you can see some of that happening.

I've always been a believer in adding the qualitative in. To me there's no substitute for talking with people who are actually doing the cutting-edge research in whatever the area is because they may have unpublished knowledge, they have tacit knowledge, they do have a sense of what does and doesn't work and so there's still going to be a kind of subjective and bespoke element to this kind of foresight.

AT

One example where this is already happening, and with profound policy implications, is UNHCR which they are using AI to predict where the next refugee crisis is going to happen. It's uncertain how successful they've been - this is a fairly new initiative - but they're testing it out in Africa and, if governments get that data and say, "okay the next crisis is going to happen in our neighborhood", they have two choices: they can either prepare the humanitarian response, or they can put up a wall. With trends analysis like this, it comes back to the point it was made earlier that the technology is not necessarily the problem, it's what we do with it. The trend isn't necessarily the problem, it's how we respond to it.

HP

In any of the areas that deal with assumptions, I'd be less trusting in the AI and the Big Data piece because they have a lot more nuance involved with them. Otherwise, I would be relatively more trusting. There's a relative word there but, it would be trust and verify. There is the utility of bringing experts in to try to understand, is this

logically consistent? How does that work? The other thing I would be very wary about is putting AI and Big Data to work to give you the solution, so AT's point about UNHCR figuring out where the next crisis is going to be worries me, because they're almost certainly going to be wrong because there's going to be something they're not going to quite get right.

But you can use Big Data and AI to help you understand where plausible scenarios might fall and then you can use that in a more traditional scenario analysis sense to then work out what your kind of families of potential solutions look like.

MB

Agreed with HP: AI/BD won't give us "the solution".

AT

I agree with HP. AI can be a useful tool for planning and scenarios. It could also perhaps prompt some early interventions to prevent the exodus in the first place. For decades the UN and other organizations have been measuring state fragility in the hopes of developing early warning mechanisms. The International Food Policy Research Institute is using AI to refine their indicators for measuring nutrition levels in food.

CDP

To add something to predicting outbreaks, we should consider the global implications for a specific country to uncover one, thinking about the case of South Africa and how it was "punished" for "having" a new variant. So, while technology may help detect new potential outbreaks, the question is what we do with that information.

MB

Agreed with CDP, South Africa modeled the "no good deed shall go unpunished" problem.

JS

We need to understand and find opportunities for linking the predictive with the explorative approaches, or looking at predictive approaches with explorative approaches and seeing how to use foresight methodologies, like scenario building, to stress test some of the assumptions and explore some of the assumptions that are in some of these models, and figure out what that could tell us.

We need to do some sense-making of all the different strands that have come together in our discussion and do, in subsequent sessions, some rankings and assessments given the multidisciplinary backgrounds that we have and the inputs and discussions. And as MB was talking about, we need to combine that unpublished knowledge we have, that tacit knowledge we have, along with the innovation concept of when experts get together and think about some of the potential causal linkages that could emerge and about plausible possible features in a more scenario-based methodology.

JN

All forecasts turn out to be wrong. But we have to use all the tools to develop the best forecasts

JS

Forecasting is often wrong. It's not about predicting the future, it's about understanding what we think our range of potential vulnerabilities is. How do we mitigate that and where do opportunity spaces develop, and how can we potentially develop that, and stress test our strategies around that? So, it's a resilience tool rather than, "I'm here to predict the future".

DH

Within Big Data and foresight, the thing to keep in mind is that there are dark zones, dark worlds, and dark aspects of the physical world that we don't have enough data to actually make meaningful statements about and we have to keep in mind zones that are not considered economically viable or not interesting enough, or not safe enough, or things that are still not so easily translated into data like smells and feelings and emotions.

TCP

A vision which is slightly further out, but radical, and seems entirely possible is to think about data and AI being used in control problems rather than forecasting problems. We want forecasts because we need to control complex systems and you can't look at those videos that DeepMind did of getting the machines to learn how to play Tetris and discover an absolute fail-safe way of winning Tetris every time…. It shows us what a control system that learns artificially is going to end up being, and in economics, it seems that the game is going to move from forecast to automatic policy.

Given the circumstances - the energy prices, the investment needed, the et cetera et cetera - in whose bank account do we need to put a piece of programmable money? What restrictions need to be on that programmable money? This is a problem that is a complex system much more suitable for being controlled by a machine. And to some degree, understandability and causality are, in this view, a result of our human limitations and that actually we should be preparing ourselves for the world, not in five years' time but let's say in twenty years' time where we have delegated more and more control. There's a wonderful essay on this by David Weinberger in EON, which argues that causality has philosophically never been something that anyone could pinpoint. Maybe we live in a world of control, not causality.

MK

We had the exact same dilemma at GARI. We were able to get interesting - and very quick - results while using the "black box" approach but it simply had zero analytical or interpretative value

TCP

Interpretation is not necessary if you hand over control!

DK

On gaining confidence around Big Data and AI trends for forecasting questions, I resonate with what was said earlier on the actual data. Do you trust the data? And how reasonably complete are your sources or your source data? In organizations, data is a big problem because it's not harmonized, so even if the technology is there, the whole prerequisite of data readiness is a challenge. And that's something that organizations really have to get an understanding of at this early stage to make sure that they can really optimize the usage of AI/ML in the future.

And the other part as well is on the collaborative data you don't just need data from inside and external market data, how about your ecosystem of suppliers and customers. Are they open to sharing data as well so that you get a full picture?

CDP

Opening the scope of conversation here, we're talking a lot about AI for predicting the future, and as we know AI is based on the past. As we've mentioned there are certain limitations to trying and doing that, how realistic can it be? But what if we looked at other ways? There's a debate of how creative or imaginative can AI be? AI cannot be extremely imaginative, but people can be and this comes to the conversation of technology and humans working together. The French military hired science fiction writers to try and imagine what future scenarios could come into play and what we should do about them. The merging of technology and humans is really interesting to think about in broader terms.

BF

As someone who spent many years doing forecasting at a central bank, we used to have a neural net and it always forecasted three percent and we were asked, why is it forecasting three percent? No idea. So we think, let's just incorporate that in our information set and we'll use a whole bunch of other models to help build our economic forecasts. In the end, it really comes down to, what's the question you're trying to answer, and what's the appropriate technology to help you answer that question and bring it into your judgment set? Humans should always be the ones that make the decisions. How do we use technology to make better decisions?

PG

The question of going beyond forecasting to policymaking is - within my area - a struggle. The question I have for the tech folks is do new technologies introduce speed of data gathering in a way that can be useful to policymakers? Just thinking about value chains for example, when we became aware of the significant disruptions in value chains due to the pandemic, due to other things, the first thing the US government did was throw really enormous resources, resources that only the US government would have at mapping their value chains because they didn't know from a security standpoint or, from a variety of other standpoints, what they were. Thus, the speed of data gathering becomes an issue for policy making. Is there a velocity or a speed dimension to technology as we think about data and how it can contribute to policy making?

CDP

To answer PG, the challenge at the intersection of both tech and policymaking isn’t so much a question of speed, it's more a matter of exactly how granular is the data that you're recollecting? Is it a general overview or do you really have the insights necessary to understand who needs what? Speed isn't the challenge, at least not here.

What do you think hasn't been touched upon in our debate today? What are you missing from this debate? What do you think should be said at the symposium? What should be one of the key program elements? And did you miss more debate about geopolitics and warfare because I know we didn't touch upon that much? Basically, what's important and what do you think needs to be said on the big stage?

DW

This whole thing has been as my friend and colleague, Jim Blight once said in a room in Havana, like drinking champagne from a fire hose. It's been so interesting and so fast-paced that I haven't been able to tease out the things people have said that are inconsistent with things that other people have said. And so if the rapporteurs are willing to go through and kind of just flag things on which there was an unexplored disagreement that might be really helpful later down the road.

TCP

I wonder if existential risk - the things Martin Rhees and Toby Ord talk about - might be a good topic for the big stage?

BF

I'm not sure about the end result, but I'll be interested to hear from the computer scientists at the next stage and how they're thinking about the governance of the technologies they're developing and how they're embedding privacy by design and other things into the development of the technologies themselves.

There may be a generational shift too. The younger generations are taking this more seriously and the things we've seen with Facebook and other platforms have revealed how vitally important this is.

HP

It would have been nice to have more discussion about global shocks in our discussion. I don't only mean conflict but also Covid, pandemics, and maybe economic shocks as well. We talked a lot about continuities and maybe a little bit less about discontinuity, so it would be perhaps good to explore that a bit more later.

DK

I agree about discussion on global shocks and for the next panel, I would be very interested to learn about how the experts think about what data/AI could have done to prevent/mitigate them.

MB

When people refer to geopolitics and, picking up on something HP just said, it's often about conflict but I do think it's worth exploring where there are – or could be - collaborative efforts to develop technology, to explore alternative solutions… nobody to my recollection mentioned open source, and there's a lot of religion about open source. But it is worth thinking, especially for an activity focused on the future, whether some of these concepts that challenge the hegemony of Big Tech will eventually actually be more effective, or more pervasive or more influential than they might have been today. Although certainly, under the covers, they're clearly in evidence.

JN

Are we at some awkward point where we have a massive discontinuity on our doorstep, whether it's food, energy, trade, severe economic dislocation… Are we anywhere close to being able to say we're in 1914 and we don't know whether we'll even be able to meet in September? Who can predict that?

CDP

One of the topics we haven't covered so much but BF mentioned briefly was the next generations, and how they're thinking about what the world should look like. They're clearly more conscious about climate change, they want a fairer world… how will that translate into their adulthood when they're working? What will the world look like under them? Minds are changing.

IF YOU GOT TO THE END

Thank you for going through the report - if you have any questions, suggestions, answers, please write them down and have them ready for your panel on the 23rd of June. We will be making a report from the 2nd panel as well as a joint report. We will have the 3rd and final 2022 N100 Expert Panel on September 7th where we invite our experts from both the first and second panel as well as our N100 confirmed speakers for 2022 to discuss *only* the overlapping issues or newly formed questions that will benefit from the attendance of experts from both panels - the agenda will be created based on the results of the 2nd panel and will be shared with all by mid-August.

1ST NEXT 100 EXPERT PANEL - April 28th, 2022 - Experts

1. Taming Volatility

- **Iain Begg**, London School of Economics, Professorial Research Fellow at the European Institute
- **Bob Fay**, Centre for International Governance Innovation (CIGI), Managing Director, Digital Economy
- **Hans Pung**, President of RAND Europe; Vice President, RAND Corporation

2. Digitally Challenged

- **Marjory Blumenthal**, Director, Technology and International Affairs Program/Senior Fellow at Carnegie Endowment for International Peace
- **Tony Curzon-Price**, senior policy advisor to the Prime Minister, 10 Downing Street, UK Cabinet Office
- **Claudia May Del Pozo**, Executive Director, C Minds Eon Resilience Lab

3. World Unchained

- **Patricia Goff**, Associate Professor, Department of Political Science, Wilfrid Laurier University and a senior fellow at CIGI
- **Michal Koran**, Founder & President of the Board, Global Arena Research Institute
- **Donna Avellana Künzler**, Process Improvement and Digital Transformation Leader | Award-winning Author | Postgraduate in Strategy and Innovation

- **Jeffrey Saunders**, Chief Executive Officer, Nordic Foresight

4. Keeping the Lights ON

- **Jatin Nathwani**, Founding Executive Director, Waterloo Institute for Sustainable Energy (WISE); Ontario Research Chair in Public Policy for Sustainable Energy, University of Waterloo
- **Florian Neukart**, Member of the Board of Management for Product, Terra Quantum AG, Assistant Professor, Leiden Institute of Advanced Computer Science, formerly Director of Volkswagen Group's Data Lab

5. New Polarity

- **David Hesse**, foresight and strategy, Mercator Foundation Switzerland
- **Arthur de Liedekerke**, Project Manager, Rasmussen Global, Non-resident fellow, Institute for Security Policy at Kiel University
- **Andrew Thompson**, adjunct assistant professor, political science, University of Waterloo, senior fellow at CIGI, Global Governance Programs, Balsillie School of International Affairs
- **David Welch**, University Research Chair and Professor of Political Science, University of Waterloo

Moderated by: Odessa Primus, Executive Director, Global Arena Research Institute

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Experts' Bios

Daniel Bagge, Strategist, Military Intelligence of the Czech Republic, former Cyber Attaché to the United States and Canada, National Cyber Security Strategy Expert Group

Daniel Bagge is a strategist. He was a Cyberattache in Washington D.C. from 2018-2021 where he was responsible for relations with the United States and Canada. He held the position of Director of the Cyber Security Policies Department at the National Security Office then at NÚKIB also. He also worked as the Secretary of the Cyber Security Council, chaired by the Prime Minister of the Czech Republic. He is regularly invited to speak at cyber security events around the world.

Iain Begg, London School of Economics, Professorial Research Fellow at the European Institute

Iain Begg is a Professorial Research Fellow at the European Institute, London School of Economics and Political Science. His main research work is on the political economy of European integration and EU economic governance. He has directed and participated in a series of research projects on different facets of EU policy and his current projects include studies on the governance of EU economic and social policy, the economic and fiscal consequences of Brexit, evaluation of EU cohesion policy and reform of the EU budget. His other recent research projects include work on policy coordination under EMU and the social impact of globalization. He has also undertaken a number of advisory roles, including being a member of a groupe de prospective on the future of cohesion policy, serving as the rapporteur of the high-level group that carried out the interim evaluation of the EU' 7th Framework Programme for Research and acting as an expert witness or specialist adviser on EU issues for the House of Commons Treasury Committee, the House of Lords European Communities Committee and the European Parliament.

Joachim Bitterlich, Professor, École Supérieure de Commerce de Paris, former Senior Advisor to Chancellor Kohl

Joachim Bitterlich is Professor (Adjunct) at the École Supérieure de Commerce de Paris (ESCP Europe) and Vice-President of the Jacques Delors Institute. In 1976, he entered the Federal Foreign Office; he was posted to Algiers (1978-81) and Brussels (Permanent Representation to the European Communities –1981-85). He was Advisor in the private office of the Minister of Foreign Affairs, Hans-Dietrich Genscher (1985-87), head of the European Policy Department at the Federal Chancellor's Office (1987-93) and Foreign and Security Policy Advisor to Federal Chancellor Helmut Kohl (1993-98), and then Ambassador, Permanent Representative of the Federal Republic of Germany on the North Atlantic Council Brussels (1998-99), Ambassador to the Kingdom of Spain and the Principality of Andorra (1999-2002). He was the Executive Vice President International Affairs of Veolia Environnement SA in Paris (2003-2012), and also Chairman of Veolia Environment Germany in Berlin (2009-2012).

Marjory Blumenthal, Director, Technology and International Affairs Program/Senior Fellow at Carnegie Endowment for International Peace

Marjory Blumenthal is a senior fellow and the director of the Technology and International Affairs Program at the Carnegie Endowment for International Peace. Her research focuses on technology trends, impacts, and policy, with an emphasis on information and communications technologies and extending to biotechnology, health, and more. Before she joined the Carnegie Endowment, Blumenthal led the experimental Science, Technology, and Policy Program as a senior policy researcher at the RAND Corporation, before which she was the executive director of the President's Council of Advisors on Science and Technology at the White House. Some of her recent publications include a pair of RAND reports on the safety of motor vehicles that depend on artificial intelligence, *Safe Enough: Approaches to Assessing Acceptable Safety for Automated Vehicles and Measuring Automated Vehicle Safety: Forging a Framework*, and another pair of RAND reports on citizen science, *Community Citizen Science: From Promise to Action and The Promise of Community Citizen Science.*

Tony Curzon-Price, senior policy advisor to the Prime Minister, 10 Downing Street, UK Cabinet Office

Tony Curzon-Price is the Senior Advisor at the UK Cabinet Office (which supports the Prime Minister and ensures the effective running of government). Before this, he was the Economic Advisor to the Rt Hon Greg Clark MP, Secretary of State for Business, Energy, and Industrial Strategy. He worked closely on the elaboration of the UK's Industrial Strategy White Paper, as well as on government responses to GAFA, climate change policy and competition and consumer policy. He has previously worked for the Financial Conduct Authority and the Competition and Markets Authority. He founded Arithmatica, a Silicon Valley design company, and spent five years building the company in the Bay Area. He was also editor-in-chief of the UK political website openDemocracy, where he transformed openDemocracy into a not-for-profit editors' cooperative for comment, analysis and investigation. He wrote his PhD on game theory and market design with Ken Binmore at UCL.

Arthur De Liedekerke, Project Manager, Rasmussen Global, Non-resident fellow, Institute for Security Policy at Kiel University

Arthur de Liedekerke is a cybersecurity policy and strategy expert working with Rasmussen Global where he assists with political consultancy in the Brussels office. De Liedekerke served as a Strategy Officer in the French Ministry for the Armed Forces, advising the leadership of its Cyber Command. Prior to this, he worked for CERT-EU, the cybersecurity entity tasked with protecting the EU institutions, bodies and agencies, managing its communications and external relations. He started his career as a parliamentary assistant, successively supporting two MEPs, including a vice-chair of the European People's Party in the European Parliament.

Claudia May Del Pozo, Executive Director, C Minds Eon Resilience Lab

Claudia Del Pozo is the Director of the Eon Resilience Lab at C Minds. Her work equips individuals with the knowledge and key skills they need to take advantage of the impact of new technologies, working with companies and governments to guarantee a fairer and more inclusive future for all people. She is working on a practical guide for the development and ethical adoption of artificial intelligence (AI) systems within Latin American companies, is co-designing an agenda for the future of work in León, Mexico, and is leading a prototype of public policies for more transparent and explainable AI systems in collaboration with Facebook and the Inter-American Development Bank (IDB) with the support of the National Institute of Transparency, Access to Information and Personal Data Protection (INAI). She has just published a paper in the digital magazine Agua de Limón on the impact of product standardization and automation on gender equality. Claudia is a Ted speaker, has previously worked at IBM Germany, and is a graduate at Warwick Business School in the UK.

Bob Fay, Centre for International Governance Innovation (CIGI), Managing Director, Digital Economy

Robert (Bob) Fay is the managing director of digital economy at CIGI. He is also a member of the 2020–2021 Information and Privacy Commissioner of Ontario (IPC) Ad Hoc Strategic Advisory Committee, providing feedback on the priorities the IPC will focus on over the next five years. Prior to joining CIGI, Bob held several senior roles at the Bank of Canada (BoC), most recently as senior director overseeing work to assess developments and implications arising from the digitization of the Canadian economy. He has also led the BoC's Canadian short-term forecasting team and set up and led its first research division related to structural analysis, focusing on labor markets, productivity and exchange rate analysis. Bob was also special assistant to BoC Governor Mark Carney, serving as the governor's chief of staff.

Patricia Goff, Associate Professor, Department of Political Science, Wilfrid Laurier University and a senior fellow at CIGI

Patricia Goff is an associate professor of Political Science at Wilfrid Laurier University. Prior to Prior to joining Laurier, she taught in the Political Science Department at the University of Utah (2000-2003). She has held visiting positions at School of International Relations at the University of Southern California and at the Graduate Institute of International and Development Studies in Geneva. She is interested in international political economy, international relations theory, and international organizations. Within international political economy, she focuses on the politics of trade and researches the intersection of cultural claims with the economic mandates of international organizations.

David Hesse, foresight and strategy, Mercator Foundation Switzerland

David works in foresight and strategy at Mercator Foundation Switzerland in Zurich. From 2012 until recently, he was lecturer of History at the University of Zurich. Previously he was the Head of Publicatios at W.I.R.E., an independent think tank that curates the shaping of the future at the interface between science and practice. The foundation for this is a systematic early recognition of relevant developments and their translation into long-term strategies and fields of action for private and public organisations and their decision makers. Also, previously a journalist and US-correspondent at Tages-Anzeiger.

Michal Koran, Founder & President of the Board, Global Arena Research Institute

Michal Kořan is the President of the Board and founder of the Global Arena Research Institute an Assistant Professor at the Faculty of Social Sciences, Masaryk University in Brno. In 2017 and 2018, he has served as a Deputy Executive Director of the Aspen Institute Central Europe. Until June 2017, he was a Senior Research Fellow at the Institute of International Relations based in Prague (Czech Republic) where he previously acted as a Deputy Director (2013 – 2016) and a Head of Research (2009 – 2013). In 2012, he was a Fulbright Visiting Scholar at the Weatherhead Center for International Affairs at Harvard University. In 2007 – 2017, he was the lead-author of an annual book analyzing Czech foreign policy and founder and programme chair of an annual International Symposium Czech Foreign Policy. In 2013 – 2014 he was a vice-chairman of the Program Council of the Czech-Polish Forum. He was, among others, a national co-coordinator of the Think Visegrad platform, a main coordinator of the Strategic Grant of the International Visegrad Fund The Visegrad Group in the Post-Lisbon EU: Getting Closer to Move Further as well as the strategic IVF grant V4 CARE ARSEC.

Donna Avellana Künzler, Process Improvement and Digital Transformation Leader | Award-winning Author | Postgraduate in Strategy and Innovation

Donna Avellana Kunzler is the Head of Procurement Process Excellence & Digital Transformation for ABB's Robotics and Discrete Automation business. She is a Process Improvement and Digital Transformation Leader by profession and has a postgraduate degree in Strategy and Innovation from the University of Oxford. She is a Certified Public Accountant, Certified Information Systems Auditor, and Certified MSP Foundation and Practitioner in Program Management. An Information Technology Auditor/ Consultant for most of her career, she has worked for E&Y and Singapore Airlines in Singapore, and PricewaterhouseCoopers in the Philippines, US, UK and Switzerland. She self-published her book, "The Overseas Fabulous Pinay: a modern Filipina's handbook on how to thrive abroad" to realize her advocacies on women empowerment, education, and promotion of the welfare of foreign workers. It has won the Best Independent Book Award 2021 for Nonfiction – Living Abroad, Gold Award in Literary Titan Book Awards 2021, Gold Award in the Nonfiction Book Awards 2020, and honored as a finalist in the Best Book Design category in the International Book Awards 2020.

Jatin Nathwani, Founding Executive Director, Waterloo Institute for Sustainable Energy (WISE); Ontario Research Chair in Public Policy for Sustainable Energy, University of Waterloo

Professor Jatin Nathwani is the founding Executive Director, Waterloo Institute for Sustainable Energy (WISE) at the University of Waterloo. As the inaugural Ontario Research Chair in Public Policy for Sustainable Energy

(2007-2020), he has led research initiatives on accelerating energy transitions for a zero-carbon economy through systems assessments of technology, financing strategies, risk management and public policy. He also co-Directs with Prof Joachim Knebel (Karlsruhe Institute of Technology, Germany) the Global Change Initiative – Affordable Energy for Humanity (AE4H). The consortium comprises 150+ leading STEM and social science researchers, energy access thought leaders and practitioners from 50 institutions in 30 countries committed to eradicating energy poverty by 2030. His organization, WISE, aims to foster research and development for clean energy solutions that remain accessible and affordable for all. Professor Nathwani has also worked in a leadership capacity in the Canadian energy sector for 30 years.

Florian Neukart, Member of the Board of Management for Product, Terra Quantum AG, Assistant Professor, Leiden Institute of Advanced Computer Science, formerly Director of Volkswagen Group's Data Lab

Prior to joining Terra Quantum, Dr. Florian Neukart was the Director of Volkswagen Group's Data Lab – an innovation center focusing on artificial intelligence and quantum computing research and development along Volkswagen Group's value chain – which he helped establish from 2014 onwards. In addition, he founded and was the Director of the Advanced Technologies Group at Volkswagen Group Region Americas in San Francisco, where he orchestrated several research efforts related to quantum computing, artificial intelligence, and energy technologies. Before, he held various management and research positions in industry, academia, and consulting. Florian is also an assistant professor at the Leiden Institute of Advanced Computer Science teaching quantum computing, is on multiple advisory boards and committees focusing on advanced technology and its impact on society, and authored books on artificial intelligence and energy. He is a member of the World Economic Forum's Future Council on Quantum Computing, in the Board of Trustees of the International Foundation of Artificial Intelligence and Quantum Computing, a co-author of Germany's National Roadmap for Quantum Computing, and on the Advisory Board of Quantum.Tech.

Hans Pung, President of RAND Europe; Vice President, RAND Corporation

Hans Pung is president of RAND Europe, a not-for-profit public policy research organization that helps improve policy and decision-making through research and analysis. Pung joined RAND as a policy analyst in 2002 and continues to lead and deliver research projects, particularly around industrial economics and security policy issues. Before joining RAND, Pung served as an engineer officer in the United States Army with responsibility for logistics, personnel, and operations and overseas service in the United Kingdom, South Korea, and Germany. His recent projects include Cost Modeling and Skills Analysis, European Defense Industrial Base Analysis, Future UK Military Capability Requirements, Improving Counter-Violent Extremism Intervention. Pung is a mathematics graduate of the United States Military Academy at West Point where he commanded the United States Corps of Cadets as a senior. He also holds advanced degrees in mathematical modeling and modern history from Oxford University, which he attended as a (George C.) Marshall Scholar.

Odessa Primus, Executive Director, Global Arena Research Institute

Odessa Primus is the Executive Director of the Global Arena Research Institute, as well as the Coordinator of its flagship annual event the Next 100 Symposium and global youth programme ReDefine Next 100. She is also the main host of GARI's podcast Last Week on Earth with the Global Arena Research Institute. She is the holder

of numerous awards and distinctions as a young leader including Young Leader for Europe at the European Commission's European Development Days 2017, European Forum Alpbach - as an Erste Foundation & National Endowment for Democracy fellow; Advisor on the UNSC Resolution 2250 on Youth, Peace & Security at the European Regional Consultation in Brussels, a One Young World scholarship holder, among others. Until January 2017, she worked as a humanitarian worker on initiatives in response to the 2015/16 refugee and migration situation in Europe. In 2017, Odessa founded Go Think Initiative, a think tank that focused on the development of media and its impact on politics and society, analyzing trends in communication technology and trends, analyzing the media environment of Central Europe, namely the Visegrad countries.

Jeffrey Saunders, Chief Executive Officer, Nordic Foresight

Jeffrey Saunders is the CEO of Nordic Foresight and is an expert in strategic futures studies and foresight with 18 years of experience. He. He formerly served as Director, Copenhagen Institute for Futures Studies, and led their Strategy and Innovation. He also served as an onsite advisor at the Office of the Secretary of Defense, Stability Operations. He further served as a policy analyst and advisor at the Strategic Assessment Center at SAIC, where he advised the Office of Net Assessments at the Department of Defense and other government agencies. He has conducted foresight exercises for Fortune 100 organizations and governments. He has authored over 30 articles, reports, book chapters, etc., on the future work and the future of the built environment. He also authored 17 ethnographic analyses of subnational and organizational cultures along the Andean Ridge, North Africa, and the Middle East.

Andrew Thompson, adjunct assistant professor, political science, University of Waterloo, senior fellow at CIGI, Global Governance Programs, Balsillie School of International Affairs

Andrew Thompson is adjunct assistant professor of political science at the University of Waterloo, senior fellow at the Centre for International Governance Innovation, and the Global Governance Programs and Partnership Manager at the Balsillie School of International Affairs. Andrew is the author and co-editor of five books, focusing mainly on human rights issues. He has also appeared as an expert witness before the Canadian House of Commons Standing Committee on Foreign Affairs and International Development, and the Canadian Senate Standing Committee on Human Rights. In 2004, he was part of an Amnesty International human rights lobbying and fact-finding mission to Haiti. In 2016, he participated in a number of United Nations consultations on issues of reform of the global refugee protection system, and in 2017 was named Special Advisor to the World Refugee Council.

David Welch, University Research Chair and Professor of Political Science, University of Waterloo

David A. Welch is University Research Chair and Professor of Political Science at the University of Waterloo and at the Balsillie School of International Affairs. At BSIA, he is part of the Conflict and Security and Global Institutions, Diplomacy and Justice research clusters. His 2005 book Painful Choices: A Theory of Foreign Policy Change (Princeton University Press) is the inaugural winner of the International Studies Association ISSS Book Award for the best book published in 2005 or 2006, and his 1993 book Justice and the Genesis of War (Cambridge University Press) is the winner of the 1994 Edgar S. Furniss Award for an Outstanding Contribution to National Security Studies. He has also authored several other books and publications.