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FLOURISHING URBAN FUTURES TO OVERCOME POLYCRISES – ROADMAP FOR RESILIENCE 2050

Millennium Project Special Sessions at FFRC Conferences 'Planetary Futures of Health and Wellbeing', 16 June 2022 & 'Empowering Futures – Long-Term governance, Democracy and Futures Research', 15 June 2023, Turku, Finland

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"Central thrust of science & technology policy should be to pursue science and make technology that enhances our consciousness."

Jerome Glenn
Future Mind (1989)

PREFACE

As cities and our economies become more dependent on Artificial Intelligence (AI), we will have more time to invent our futures. We are used to learning how to "fit in," but less experience learning how to become what we want to be. How do we know what we want to be? We receive our identity from our job, our ethnic origins, our gender, and where we live. We are not used to inventing our identity. As AI evolves from artificial narrow intelligence (ANI) to artificial general intelligence (AGI), much of our work is likely to be automated. As labor is taken out of the production process, prices should begin to fall, reducing the cost of living. Simultaneously, as next technologies (NTs) like synthetic biology, nanotechnology, AI, robotics, etc. produce new tax revenues, universal basic income (UBI) should eventually become financially sustainable. If so, then just as our autonomic nervous system frees the mind to think, AI and other NTs will free humanity to more consciously, deliberately, invent its future.

However, if we do not create national and international governance systems for the transition from ANI to AGI, then artificial super intelligence (ASI) could emerge from many unregulated AGI systems beyond our understanding, awareness, control, and maybe not to our liking. To avoid this the Executive Office of the UN Secretary-General is beginning to create the framework for international regulations and the International Parliamentary Union is facilitating collaborations among national legislatures to begin writing the national regulatory systems. If such governance systems are not in place by the time AGI is created and released on the Internet, then our ability to control how AGI shapes ASI is lost. And we can only pray it turns out ok. It might, but why take a chance. Better to work on the regulations now, since we do not know how soon AGI will arrive and how long it will take for ASI to emerge from AGI. Not just regulations for ANI, but also regulations for AGI that is not yet here.

Programs and actors like the Finland Futures Research Centre (FFRC) and the RESCUE Project that encourage participation in exploring these issues today are very important for our future. 'No man is an island' as John Donne wisely put it. It is all about fruitful and dedicated collaboration.

Jerome Glenn, CEO of the Millennium Project
Washington D.C., 19th October 2023

ABSTRACT

This report "Flourishing Urban Futures to Overcome Polycrises – Roadmap for Resilience 2050" is published as the result of two Millennium Project Special Sessions, held at the annual FFRC Futures Conference in Turku, Finland, as interactive Futures Cliniques. The results for the two MP Special Sessions – 2022 and 2023 – are here combined to supply the reader with a continuum of reflections of urban resilience on which the overall results are based. Accordingly, the nature of the report is illustrative documentation of a methodological experiment for participatory cognitive crisis management within the RESCUE project.

Developing resilient and smart cities have become increasingly important considerations for the future. The rapid development of AI will also undoubtedly influence this development in significant, yet to be determined, ways. The way in which AI will be regulated is under scrutiny and will determine its effectiveness, scope and ramifications, also in the field of urban planning.

Resilient and smart cities will be influential in the future well-being of its citizens. Not only that, but the development of not one but two or more crises – polycrises – will likely become more prevalent in societies of the future. How could these cities look like, what services could be offered, how would these cities deal with polycrises, and what policies are needed, and which roadmap is adapted? These questions have been asked in the Millennium Project Special Sessions. Finding ways to secure resilient development of these cities for the future were the aim of the Special Sessions. The Futures Cliniques consisted of presentations and small group working. In the 2023 session, five groups addressed five different crises and even added another crisis to the one given to them for elaboration, to demonstrate immersion in a polycrisis. The insights provided by this report are intended to help give momentum to the rise of resilient, inclusive, and eco-smart cities of the future.

Key words: Millennium Project, urban resilience, crisis management, polycrises, Futures Cliniques

RESUME

Ce rapport « Un avenir urbain florissant pour surmonter les polycrises – Feuille de route pour la résilience 2050 » est publié à la suite de deux sessions spéciales du Projet Millennium, organisées lors de la conférence annuelle FFRC à Turku, en Finlande, sous le nom de Futures Cliniques interactives. Les résultats des deux sessions spéciales – 2022 et 2023 – sont ici combinés pour fournir au lecteur un continuum de réflexions sur la résilience urbaine sur lequel reposent les résultats globaux. En conséquence, la nature du rapport est une documentation illustrative d'une expérience méthodologique de gestion cognitive participative des crises au sein du projet RESCUE.

Le développement de villes résilientes et intelligentes est devenu une préoccupation de plus en plus importante pour l'avenir. Le développement rapide de l'IA influencera sans aucun doute également cette évolution de manière significative, encore à déterminer. La manière dont l'IA sera réglementée est à l'étude et déterminera son efficacité, sa portée et ses ramifications, également dans le domaine de l'urbanisme.

Les villes résilientes et intelligentes auront une influence sur le bien-être futur de leurs citoyens. Qui plus est, le développement non pas d'une mais de deux ou plusieurs crises – les polycrises – deviendra probablement plus répandu dans les sociétés du futur. À quoi pourraient ressembler ces villes, quels services pourraient être offerts, comment ces villes géreraient-elles les polycrises, quelles politiques sont nécessaires et quelle feuille de route est adaptée? Ces questions ont été posées lors des sessions spéciales du Projet Millennium. Trouver des moyens d'assurer un développement résilient de ces villes pour l'avenir était l'objectif des sessions extraordinaires. Les Futures Cliniques consistaient en des présentations et des travaux en petits groupes. Lors de la session 2023, cinq groupes ont abordé cinq crises différentes et ont même ajouté une autre crise à celle qui leur avait été donnée pour élaboration, pour démontrer leur immersion dans une polycrise. Les informations fournies par ce rapport visent à contribuer à donner un élan à l'essor des villes résilientes, inclusives et éco-intelligentes du futur.

Mots clés: Projet Millennium, résilience urbaine, gestion de crise, polycrises, Futures Cliniques

RESUMEN

Este informe "Futuros urbanos florecientes para superar las 'policrisis': hoja de ruta para la resiliencia 2050" se publica como resultado de dos Sesiones Especiales del Proyecto Milenio, celebradas en la Conferencia anual de Futuros de la FFRC en Turku, Finlandia, como clínicas interactivas de futuros. Los resultados de ambas sesiones (2022 y 2023) se combinan aquí para brindar al lector una serie de reflexiones sobre la resiliencia urbana, base de los resultados generales. En consecuencia, la naturaleza del informe es un documento ilustrativo de un experimento metodológico para la gestión de crisis cognitivas de manera participativa dentro del proyecto RESCUE.

El desarrollo de ciudades resilientes e inteligentes se ha convertido en objeto de atención cada vez más importantes de cara al futuro. Aunque está aún por determinar, no cabe duda de que el rápido desarrollo de la inteligencia artificial también influirá de manera significativa en este desarrollo. La forma en que se regulará la inteligencia artificial está bajo escrutinio, lo cual determinará su eficacia, alcance y repercusión, en el ámbito de la planificación urbana.

Las ciudades resilientes e inteligentes influirán en el bienestar futuro de sus ciudadanos. No sólo eso, sino que el desarrollo de no una, sino dos o más crisis (policrisis) será más común de lo normal en las sociedades del futuro. ¿Cómo podrían ser estas ciudades, qué servicios podrían ofrecerse, cómo afrontarían las policrisis, qué políticas se necesitan y qué hoja de ruta se debe adoptas? Estas preguntas se han formulado en las Sesiones Especiales del Proyecto Milenio. El objetivo de las Sesiones Especiales fue encontrar formas de garantizar un desarrollo resiliente de estas ciudades en el futuro. Las Futures Cliniques consistieron en presentaciones y pequeños grupos de trabajo. En la sesión de 2023, cinco grupos abordaron cinco crisis diferentes e incluso agregaron otra crisis a la que se les dio para su elaboración, de manera que demostrasen la inmersión en una policrisis. Las ideas proporcionadas por este informe tienen como objetivo ayudar a promover el surgimiento de ciudades resilientes, inclusivas y eco-inteligentes en el futuro.

Palabras clave: Proyecto Milenio, resiliencia urbana, gestión de crisis, policrisis, Futures Cliniques

1. INTRODUCTION

This report presents the results of two Millennium Project Special Sessions as organised within the FFRC Conferences in Turku, Finland. The topic of the first conference was 'Planetary Futures of Health and Wellbeing', held on 15–17 June 2022.[1] The second one was organised on the theme of 'Empowering Futures – Long-term Governance, Democracy and Futures Research', held on 14–16 June 2023. Both sessions were arranged in co-operation with the FFRC research project RESCUE (Real Estate in Sustainable Crisis Management in Urban Environment).[2] RESCUE is a three-year interdisciplinary project funded by the Academy of Finland and led by Aalto University, Department of Built Environment. The project consortium includes partners from Aalto University, the Department of Architecture as well as University of Turku and Tampere University. The study is multidisciplinary, a combination of futures studies, architecture, land use and spatial planning, and real estate economics. CEO of the Millennium Project[3], Jerome Glenn, gave a virtual keynote in both sessions. Both sessions were also organised in collaboration with the Finnish Society for Futures Studies. Methodologically they were conducted as compacted Futures Cliniques (Heinonen & Ruotsalainen 2013).[4]

The **Millennium Project** is a global participatory think tank established in 1996 under the American Council for the United Nations University. The Millennium Project became independent in 2009 and now it has grown to 71 Nodes around the world, connecting futures thinkers around the world and collaborating to improve global foresight. Its purpose is to improve humanity's prospects for building a better future. Its mission is to improve thinking about the future and make that thinking available through a variety of media for feedback. Thus, wisdom about the future for better decisions today is getting accumulated. The Millennium Project has a vision where the global foresight network of MP Nodes, information, and software, are building a global collective intelligence system, recognized for its ability to improve prospects for humanity. It is a **think tank on behalf of humanity**, not on behalf of a government, or an issue, or an ideology, but on behalf of building a better future for all of us.

Jerome Glenn is directing the Millennium Project with the help of the Planning Committee since 1996. The project publishes State of the Future reports, Future Research Methodology and runs a global futures intelligence system. What is currently important is that Millennium Project is working with the Executive Office of the United Nations Secretary-General to assess implementation of the foresight elements of their new report, "Our Common Agenda".[5] One of the very useful and basic frameworks that the Millennium Project is using is the 15 Global Challenges[6] because it shows the world as a holistic entity system and it is still valid. Recently Millennium Project has also been engaged in studying Anticipatory Governance,

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[1] For the FFRC Conferences, please see: https://futuresconference.fi/#:~:text=15%E2%80%9317%20June%202022%20%E2%94%82,other%20human%2Dcaused%20environmental%20pressures

[2] For RESCUE, please see: https://www.utu.fi/en/university/turku-school-of-economics/finland-futures-research-centre/research/rescue

and https://www.utu.fi/en/university/turku-school-of-economics/finland-futures-research-centre/research/rescue

[3] https://www.millennium-project.org/

[4] This means that while the time slot allocated for the session was 90 minutes, the elements and phases of a fully-fledged Futures Clinique were adapted into a shortened compact version.

[5] The assessment report by the Millennium Project was published in September 2022.

[6] https://www.millennium-project.org/projects/challenges/

Artificial Intelligence[7], as well as Futures of Work and Technology – Scenarios 2050.[8] In the following picture, UN Sustainable Development Goals and Millennium Project Challenges are positioned and compared as regards their thematique.

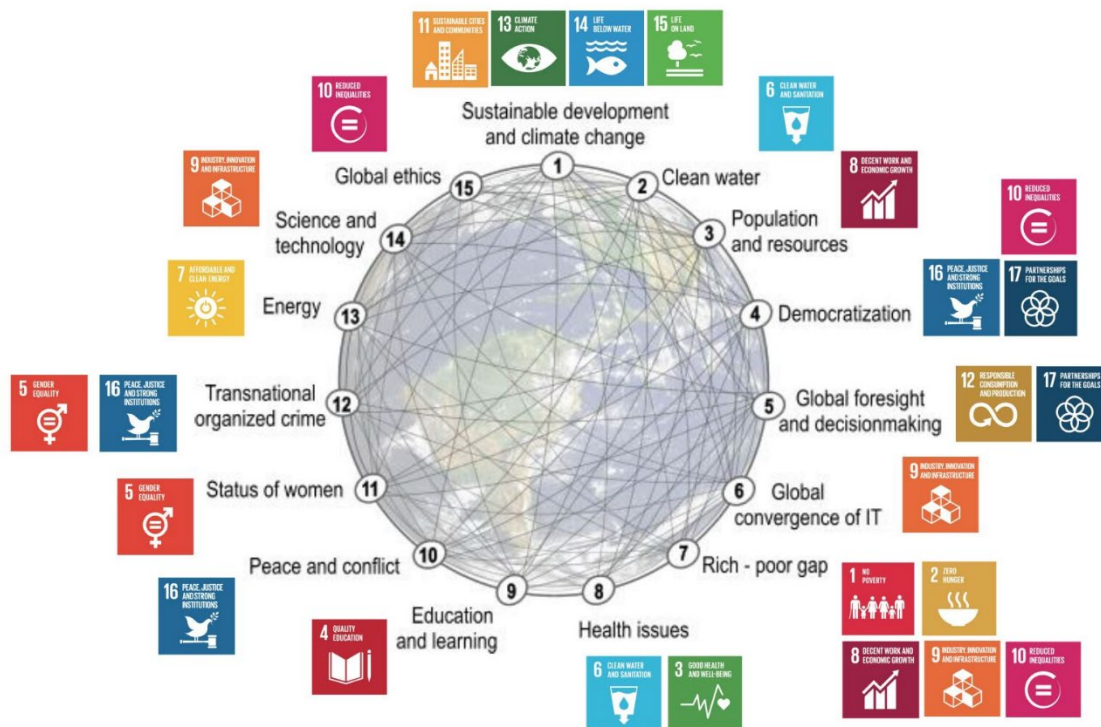**Comparison UN Sustainable Goals vs. Millennium Project Challenges**

Figure 1. *The 15 global challenges as presented by the Millennium Project and wrapped around by the 17 UN Sustainable Development Goals.*

The Millennium Project is an officially collaborating network in the RESCUE Project, as well as in the new T-Winning Spaces Project 2035 (Winning spatial solutions for future work, enabling the double twin transition of digital/green and virtual/physical transforming our societies by 2035).[9] The wider framework for both these research projects is the green and digital transition as declared by the European Commission. Crisis resilience is an important element for such transitions. Crises are paving the way for new competences and working methods at the EU level with strong economic and political coordination (Matti et al. 2023). Moreover, binding objectives and comprehensive legislation on the green and digital transition are needed and we need to invest in social equality and cohesion (Ibid.). In practice, we need principles and guidelines for promoting resilience in urban areas so that they would be able to endure shocks and

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[7] A report of Phase 1, "Artificial General Intelligence – Issues and Opportunities", was completed by the Millennium Project's AGI Steering Committee and has now been published (The Millennium Project 2023).

[8] See Glenn, J.C. & Millennium Project team (2019). Please also see Kuusi & Heinonen (2022).

[9] https://www.utu.fi/en/university/turku-school-of-economics/finland-futures-research-centre/research/t-winning-spaces-2035

disturbances, regardless of the unexpected forms that they may take. According to Eraydin & Taşan-Kok (2013) this would lead to conceptual development of urban resilience in a positive cycle.

The three Millennium Project Interns – Burgert Maree, Risto Sivonen, and Riku Viitamäki from the FFRC Helsinki Office were a key organising team of the 2023 session, as planned and supervised by the RESCUE researchers both at FFRC and Saija Toivonen and Lassi Tähtinen Aalto University. Burgert Maree was in main charge of documenting and analysing the results of the sessions into this report. Paula Pättikangas finalised the present final version. The moderators of small groups in both sessions also had an important role in the Futures Clinique process. Amos Taylor contributed to the planning of the methodological process for both sessions. It is noteworthy that many of the Helsinki Node of the Millennium Project participated in the 2023 session – Toni Ahlqvist, Mikko Dufva and Osmo Kuusi.[10] The Chair of the Brazilian Node and one of the conference keynote speakers, Rosa Alegria, also attended the session and actively contributed to it. Another keynote speaker, Elizabeth Strickler, gave good feedback of the whole process (see her and Rosa Alegria's interviews in eBook 5/2023). The authors of this report as organisers wish to accredit all the participants for their insightful contributions as well as all those planning, implementing, and documenting the events.

The Millennium Project sessions were organised in co-operation with two Academy of Finland funded research projects, RESCUE and T-Winning Spaces[11], the Helsinki Node of the Millennium Project, as well as with the Finnish Society for Futures Studies. The main emphasis in this report is on the 2023 Session. However, the process was a dynamic continuum where the 2022 session set the thematic basis and is therefore also included here as an important prelude (chapter 2) to the second session (chapter 3). Finally, some remarks and observations are given as conclusions (chapter 4).

The aim of this report is to present quite a detailed account of the process of these two sessions, executed as Futures Cliniques. This is because we wish to preserve all the insights produced and shared for further uses as well for students and stakeholders alike. Thus, we also convey a description of the methodologies and processes used within the sessions.

[10] A Millennium Project Node is a self-organizing group of institutions and individuals recognized by the Project that will facilitate the Project's research or conduct autonomous research in support of the Project. In this capacity, each Node will participate in the identification of incipient world issues and opportunities, study their prospect and their potential resolution, as well as methods for accomplishing such research.

[11] For the T-Winning Spaces 2035, please see: https://www.utu.fi/en/university/turku-school-of-economics/finland-futures-research-centre/research/t-winning-spaces-2035

2. MP SPECIAL SESSION 2022 ON GLOBAL ANTICIPATORY GOVERNANCE TO BOOST CRISIS PREPAREDNESS
– What Policy Actions are Needed for Resilient Cities and Human-Friendly AI?

The Millennium Project Special Session 2022 was organised at FFRC Conference in Turku in four stages: i) a provocatory introduction to the theme by Sirkka Heinonen (chapter 2.1), ii) keynote by Jerome Glenn followed by a Questions and Answers section (chapter 2.2), iii) a presentation by Osmo Kuusi, and iv) the small group interactive working and presenting of results (chapter 2.3).

The theme for the Special Session was underpinned by the understanding that anticipatory governance can boost crisis preparedness. Key issues were identified by asking and engaging with the following questions:

- What policy actions and regulations would be needed to make cities resilient?
- What policy actions and regulations are needed to govern a safe transmission from ANI to AGI?[12]
- What policies and regulations would be needed in combining these two goals?

Following the keynote and commentary talks, participants were encouraged to give and analyse suggestions for concrete policy actions and recommended practices. The ultimate goal was to explore possibilities for providing urban spaces that are crisis resilient, prone for healthy living and wellbeing, and embedded with trustworthy and human-friendly AI as support for daily living.

To familiarise participants with exploratory futures thinking on AI, Osmo Kuusi, Adjunct Professor in Futures and Innovation Research at Aalto University, Co-chair of the MP Helsinki Node, presented scenarios from a competition of future possibilities of AGI organised by the Future of Life Institute.[13] The main topic for the 'worldbuilding' competition was: 'What is a major problem that AI has solved in your 2045 world, and how did it do so? Kuusi presented on the entries that the 20 finalists to this competition had made on futures possibilities of AGI (Artificial General Intelligence). He stated that human language using personal assistants was the main theme of about half of the answers. Many of the other entries focused on climate change and environment. As regards to health promotion, addiction was offered as a major problem solved by AI. In this scenario, there is a powerful therapeutic option for curing it: a mix of neurotransmitter analogues, behavioural therapy, and hypnosis. Kuusi also gave an example of the economic return from predictive processing among those making investments, which has enabled the rapid economic rise of the working class. Kuusi himself has been an advocate of promoting the potential of AI in various kinds of supportive processes assisting humans or helping in improving their health and wellbeing.

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[12] This question was crucial in the Millennium Project debates and led to a study (The Millennium Project 2023).

[13] https://futureoflife.org/project/worldbuilding-competition/. The competition was organised by Max Tegmark, author of Life 3.0, and sponsored by Elon Musk. Please see the Millennium Project entry at https://worldbuild.ai/W-0000000468/. After the session, it was revealed that the Millennium Project got the fourth-place award in the competition (a total of ten entries were on this position). Entries were submitted from 44 countries.

Figure 2. Amos Taylor, Joni Karjalainen, Saija Toivonen, Sirkka Heinonen, Tero Villman and Osmo Kuusi at the 2022 FFRC Conference in Turku.

2.1 Futures Provocation

This section describes the 'futures provocation', presented by Sirkka Heinonen, Co-chair of the Helsinki Node of the Millennium Project. Futures provocation is an inspirational part of the concept of a Futures Clinique where the participants are encouraged to think very openly and differently about futures (Heinonen & Ruotsalainen 2013). It is already a tradition that there is a Special Millennium Project Session within FFRC international conferences and conducted in the modified form of a futures Clinique.

The rationale behind this Millennium Project Session is that it is interlinked with the RESCUE Project which is interested in studying our complex and changing world, and the crises we are facing. There were many participants representing the RESCUE project in this session. In a nutshell the RESCUE project addresses real estate and sustainable crisis management in urban environments. A resilient city can be defined in many ways: one of the ways is that a resilient city is the capacity of cities to function, so that the people living and working in cities, especially the poor and the vulnerable, can survive and thrive with whatever stresses, shocks and crises that are happening. (ARUP 2014; 2014b). A resilience framework by ARUP applied in the RESCUE Project is a useful illustration of a holistic entity of the modules inside this resilient city (see Figure 3). This framework was used as adapted in the Millennium Project Session.

Possible research gaps were to be identified in small groups. The working ethos in small group elaborations in this futures Clinique was an interest in **co-creating how to create liveable crisis-resilient cities**. The aim of the RESCUE project is to promote resilience by using futures policies regulations and new practices concerning real estate in crisis preparedness, and probe how the built environment can help in promoting resilience and well-being.
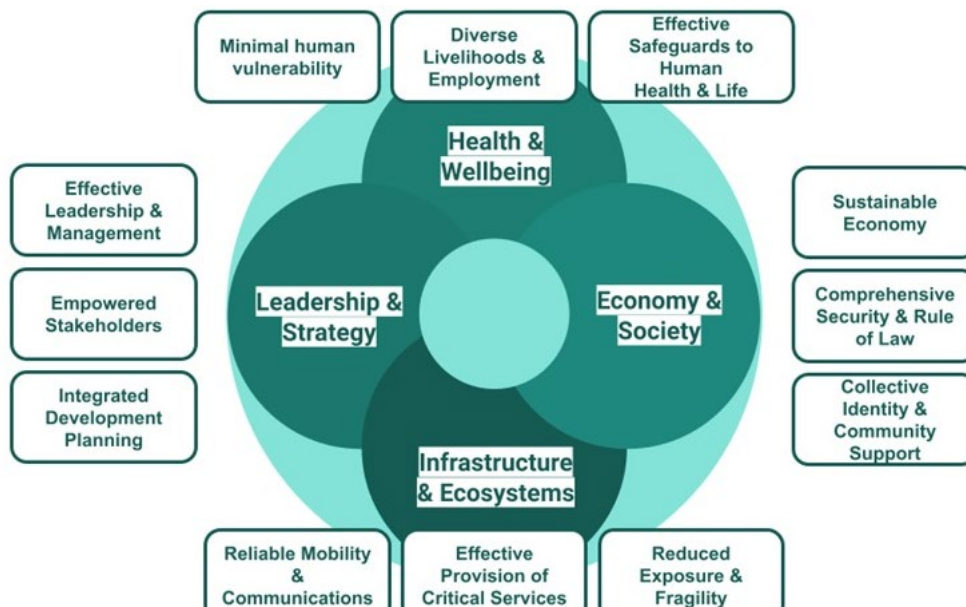
Figure 3. *Resilience framework by ARUP (2014) modified by Lassi Tähtinen.*

2.2 Global Anticipatory Governance to Boost Crisis Preparedness for Resilient Cities

This section reports Jerome Glenn's keynote. It also includes the Questions and Answers discussion with the audience.

Jerome Glenn began his keynote talk by asking the audience to consider one thing when talking about resilience: in the natural world it essentially means the **ability to respond to whatever the situation is**. With the addition of a human, we should add one point – and that is **anticipation**. **If you can anticipate a problem and solve it ahead of time, you are more resilient.** As far as Glenn knows, forests and termites do not do that.

Governance is a system of rules to make the right decisions. How this system is implemented will be different in different situations, but for Glenn, this is essentially what governance means. Now, **anticipatory governance means the same but about something that does not exist yet.** Glenn finds it constantly annoying when somebody says 'well, wait a minute, you are premature, this has not happened yet. Global Futures, intelligence of advanced systems, they do not exist yet, so you want to put together a system? It does not exist yet.' Well, that is the whole idea of anticipatory governance! This is because, if it is correct, that we are moving faster and faster, then we have less and less time to figure out how to govern a situation. We have to use foresight ahead of time to see how to do that.
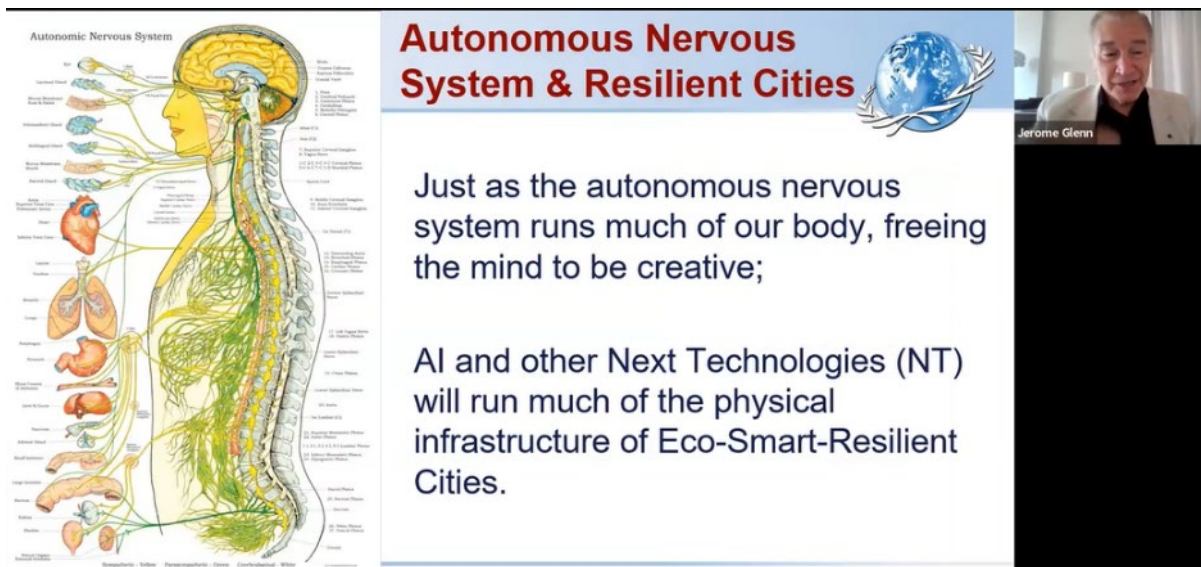
On artificial intelligence

The lack of distinguishing between the three forms of artificial intelligence is a conversation that continually frustrates Glenn. People say 'AI', but they usually do not make any distinctions between the three forms, even in government documents. The trouble is that the implications of one form of artificial intelligence are

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quite different from those of another form of artificial intelligence. What we have today is artificial *narrow* intelligence (ANI) – it diagnoses cancer, it drives a car, but that is it. It does machine learning, and it keeps getting faster and better, but it cannot be asked to do something new it has never been programmed to do before. Now**, artificial *general* intelligence (AGI) can address a novel problem**, something that has not been addressed before, and it can draw on all kinds of things – the Internet of Things (IoT), other narrow intelligences, make phone calls to experts pretending it is a human being – it is a general intelligence, which is not the same as us humans. However, it is similar to us in the sense that we can use different modes to figure out what to do next.

Glenn noted that some people believe that artificial *general* intelligence (AGI) is so complex we are never going to have it. That is possible, but our job is to look at the range of possibilities. Is it possible in 10 years? Yes, why? Because some people writing the codes on it today say it is possible, and they cannot be ignored. It may take 20 years, it may take 30 years but, as a futurist, we have to look at the range of possibilities and figure out what to do about those range of possibilities. The third form of artificial intelligence is artificial *super* intelligence (ASI). This super intelligence is what Stephen Hawking, Elon Musk, Bill Gates, and science fiction are warning about. It is general intelligence with a big difference – it can set its own goals, figure out its own ways of behaving, independent and in a much faster pace than humans can even begin to understand. This is what science fiction is worried about, this is what the warning is about, and this is why we are now pushing for the governance of general intelligence. **In the transition from narrow to general artificial intelligence, if we do not get these initial conditions right, then how general evolves into super could not be to our advantage.** These beginning conditions are like the seeds – you have to have the water, you have to have the soil, you have to have the right scent, and you have to have some sun. These initial conditions have to go right. We have to work on these initial conditions and then know how to govern them.

Glenn points out that people are also mistaken on another point as they say, 'well, general intelligence is like human capabilities, it can do things just like a human'. That is misleading because even narrow intelligence today can do better than we do – it can lip-read faster and better than we do, it can fly planes already and drive trucks better than we do. It obviously can do mathematics better than we do. Its voice translation now is better than us. It obviously can play games better – chess, Go, Deep Blue and Jeopardy and all that – and faster than we do. Face recognition is better. Medical diagnosis at Watson's cancer has been shown to be better than humans. Reading comprehension speed, legal analysis, income tax preparation, organizing shipping, specific research (we are all using Google all the time), traffic navigation (Google maps for driving around), AI robots for repetitive tasks and large-scale data analytics. AI is doing all of these things better than we are, it has already surpassed us – and that is just artificial narrow intelligence (ANI).

Healthy and resilience cities are smart integrated systems. We are making it like an autonomic nervous system.

Figure 4. *Analogy of human body systems and urban systems (Glenn 2022).*

The human body does not run because we are thinking about it, it runs automatically as the system runs our digestion and keeps the heart beating. By analogy, think of a city in this way – **a city like an integrated whole system, completely intricate**. Imagine a city like that – and then it keeps getting smarter and smarter. And this is already possible with a narrow intelligence.

Glenn requests that when we talk about a smart city system, we think of eco-smart, resilient, and healthy cities.[14] These ***eco-smart-resilient-healthy cities*** are cities with sensors, just like we have our nerves wrapped throughout our whole body. Imagine sensors in the entire city connecting the built environment, so that you know when certain areas need water or a little more sunshine. Imagine sensors connecting the natural environment and our bodies, artificial narrow intelligence evolving into artificial general intelligence eventually via the Internet of Things. **They are all connected, all as an integrated system of conscious technology**. We will become dependent on it, just as we are dependent on our autonomic nervous system. This makes us vulnerable. When our autonomic nervous system breaks down, we break down. The same goes for smart cities.

There is currently a grey area between narrow and general artificial intelligence. The emergence of AI that is beyond the normal ANI, but cannot solve novel problems like AGI, (such as DeepMind of Alphabet, called Gato, that can do 600 different functions at the same time) shows that we are slowly moving towards an actual AGI. Artificial general intelligence will be necessary for managing all the complexities of the nervous system. For example, if our digestion is not right, our body makes an autonomous decision to take care of that part and intervene with the autonomic nervous system. Accordingly, general intelligence, in a city, would do the same. This is most likely inevitable.

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[14] The concept of 'smart city' should encompass wider scope than techno-economic reflections. Bina et al (2020) argue for the need for diverse imaginaries with an emphasis on the social sciences. They claim that such an approach could even be deepened through further engagement with utopian theory and speculative fiction.
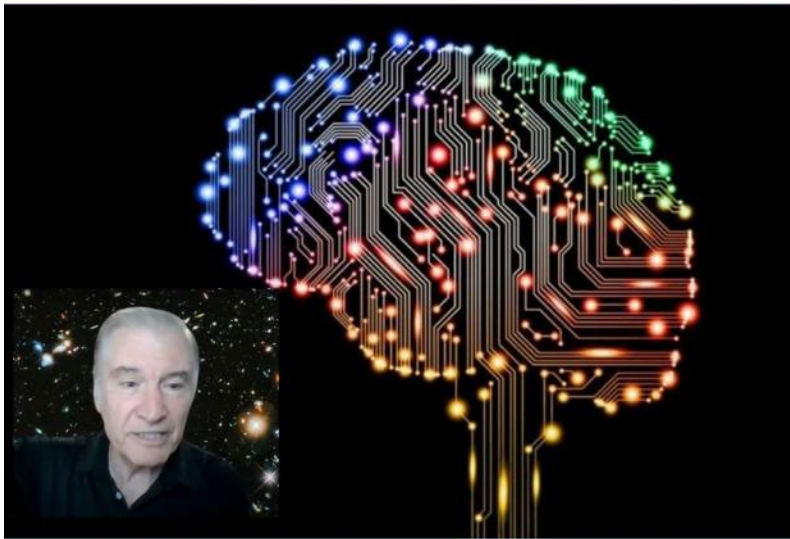
Figure 5. *Jerome Glenn delivering a keynote at the MP Special Session, highlighting the three different forms of AI (Glenn 2022).*

What is artificial general intelligence (AGI) expected to be able to do?

AGI is expected to be able to address novel problems without pre-programming like narrow intelligence. It will be able to invent strategies and procedures to address these new questions. AGI is expected to be able to initiate searches for information worldwide. It is expected **to use sensors in the Internet of Things to learn**. It is expected to be able to make phone calls and interview people. It is expected to be able to make logical deductions, reasoning similar to humans. These do not indicate consciousness, although AI will behave as if it were conscious. It is expected to be able to learn from experience and reinforcement without the need for massive databases to learn a task, like narrow intelligence needs. Lastly, it is **expected to be able to rewrite its own code and edit its code to become more intelligent, continuously.** An artificial general intelligence will be smarter every day, because it is constantly learning from global feedback. It may also communicate with other artificial general intelligence, so it gets smarter much faster than humans.

You may remember Mr. Putin made a comment two years ago: '**whoever runs AI, runs the world'**. Glenn does not think he was talking about narrow intelligence. He may not have known it, but he was talking essentially about general intelligence. China has looked at their recent plans to lead the world in just eight years – there is a race going on. **We have had the old arms race before, with nuclear weapons, now we have it in the software area**. At the same time, we have the human brain projects. **The better we understand how the brain works, the better we can make artificial intelligence.** We have brain projects in the United States, the European Union, China, and other countries. At the same time, you have also got the artificial brain projects of IBM, Google, Facebook, Baidu, Microsoft, Alibaba, Apple and Amazon, and probably some others. These simultaneous projects create the great artificial general intelli-

gence brain race! This is an international power game. **If you can really make artificial general intelligence work and you manage it, then you have a new kind of power that has never existed before in the world.**

If we do not get those initial conditions right then artificial super intelligence could evolve quickly beyond our understanding. We also have to figure out what 'right' conditions means for artificial general intelligence. We do not know how quickly artificial super intelligence could evolve. The top experts in the world working on this say 'it could never happen' or 'it could happen almost in the next instant'. This outlines that we do not know for real *what* artificial general intelligence is. Like the internet, by adding more applications than just connecting up a couple of military computers, it could blossom and evolve in any direction.[15]

Artificial super intelligence sets its own goals, independent of human awareness and understanding, and might collaborate with other super intelligences. What would they talk about? What would they do?

We may rush into creating artificial general intelligence without making the initial conditions right. This is why outside folks, like futurists, should demand the creation of a governance system before AGI gets created. The intelligence systems, the corporate sector and the military systems of China, the United States, and other countries are racing like crazy to get this done and do not want to be slowed down. They might not want to take the initiative to figure out how to do this 'right'.

Many countries around the world are currently creating their own values for good narrow intelligence. Conferences, papers and books on artificial intelligence are constantly being published. Is such an emergence of many different perspectives and views a good thing? Glenn stresses, however, that there is reason to be optimistic, and gives an example of the early days of the Internet. He serves on the IEEE[16] committee for artificial governance and was involved in getting packet switching[17] in global use in the early stages of internet. In the late 70s and early 80s, the internet and the spread of its use was thought to be a great thing. There was a growing awareness of information warfare, but no anticipation of many of the other negative issues, such as the polarization of views. The reason why many things were not thought of or anticipated was the eagerness in internet development, similar to current eagerness in AI development. However, the world is maturing. With the current debates on the values of AI, **we are assessing the future of AI more seriously than we assessed the future of the internet.**[18]

Massively complex simulation to test AGI's alignment – what does that mean? Quantum Computing is coming along, so the idea is whether we can make massively complex simulations and test AGIs ahead of time, to see how they behave.[19]

The ability to distinguish between how we act versus how we should act. This is an interesting branch coming up in civilization. We say humans do good things, and bad things, so we can study with AI how humans work. However, there is a gap between the value conversations on how AI should be done,

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[15] See Phase 1 of a MP study on AI transition from narrow to general (Millennium Project 2023).

[16] IEEE - the Institute of Electrical and Electronics Engineers. It is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

[17] Packet switching, in telecommunications, is a method of grouping data into packets that are transmitted over a digital network.

[18] See e.g., Hendrycks et al. 2023 on catastrophic AI risks.

[19] Geneva Science and Diplomacy Anticipator (GESDA) organized its third world summit at CERN (Oct. 11-13) where quantum computing was a key topic.

and how human life should be. What is interesting, however, is that as artificial narrow intelligence increases, and influences the autonomic nervous system of civilization, it may help to make us more ethical and more moral as a whole.

Should humans be able to intervene the AI?

We should be able to check why artificial general intelligence is doing something, to determine why and how it failed or caused harm. 'Transparency' is widely demanded, but we do not have a clear definition of what it means or who it applies to, 'the user', 'the head of the computer department', or 'the original programmer'. Future audit systems for AGI will require this to be clarified.

What kinds of situations then might require human intervention? If we can create an artificial general intelligence, can we be sure that it cannot replicate itself and run some tests on how to become a super intelligence? Such scenarios should be prepared for by creating guardrails to catch unanticipated behaviour that triggers an evaluation or an audit automatically, if something starts to go in a certain direction. Before we create a new technology, we should create an 'off' switch right in the beginning – and make it such that AGI cannot turn off its own 'off' switch. Some years ago, the MP did a study to research nanotechnology having 'off' switched. The motivation for the study was that there is a large number of dangerous landmines around the world, which do not have 'off' switches. **AI auditing should also be continuous, as it is constantly evolving.** What you audit one day may be irrelevant the next week.

Artificial general intelligence (AGI) Global Governance

Unlike some, Glenn does not believe that creating rules for governance too soon will stifle its development. Implementing these rules will probably take at least 10 years. We do not even have a governance system for climate change, and we have been talking about this for 50 years. And since it is believed to be possible to have AGI, as soon as in 10 years, it is wise to begin working on it now. It takes a long time to design international governance system and begin implementation.

What should AGI governance be like then? What kind of AGI governance should we build then? We already have some very potential models in other sectors. The International Atomic Energy Model (IAEA) is one example, and it is reasonably successful. Without the International Atomic Energy Agency today, we probably would have had dirty bombs going off already. It, however, needs enforcement powers, like the WTO. The difference with AGI, of course, is what you are monitoring changes each time, which is not the case with nuclear material. Nuclear material the next day is still nuclear material. Another is the International Panel on Climate Change (IPCC), which is based on great research and thus keeps us up to date. Also, the International Science Technology Organization (ISTO), an online automatic intelligence system that is monitoring all these things, different from structures like a government bureaucracy or a UN bureaucracy. None of these models are perfect, but they are models worth considering.

Humanity needs to think together about how to govern the transition from narrow to general artificial intelligence. This is a key test for our age. Are you willing to work with anyone to put these things together? Some of this work is actually currently underway with the UN Secretary General's office. United Nations (2021) report 'Our Common Agenda' is the most foresight-orientated document that has ever been done in the Secretary General's office, the word 'foresight' is mentioned 13 times. In that report you will find ideas I have been talking about today. Thank you very much and have a happy future.

Questions and Answers

Q: Thank you for this amazing talk. This is completely not my field, I am a biologist from the University of Helsinki, working at Lahti University campus. The other day I was reading about this theory about the 'singleton hypothesis'[20] by an Oxford University scientist called Nick Boström, and I was wondering what do you think what could be the future without the control that you are proposing? Or what do you see as the most likely future for the developments?

   A: What's the most likely future if we do not govern the transition?

   Q: How do you see the future, what will happen in your opinion?

   A: In general, in 25 words or less? You have got to understand I have been studying this field for 50 years, I have got a few thoughts, but I will make it in a couple of sentences. I expect that technology will continue to get smaller and smaller in size, and more intelligent, in and on our bodies and in our environments, so that there will be a continuum between human consciousness and technology. Where one begins and one leaves off, will be irrelevant, it will not matter. Like, am I talking to you right now or am I talking to a machine? Clearly, I am talking to a bunch of machines, but we forget about all that, and we say I am talking to you, right? Now, how well this goes, to me, is how well the mystic in our society, the orientation of the mystic in ourselves, and the technocrat in our society and the technocrat in ourselves, how well the mystic side and the technocrat side – the consciousness and the technology – how well we can make a Yin Yang (see Glenn 1989).[21] How they work together, the synergy between them, how well we do that is how well I think this future will turn out.

   Q: Thank you very much for your presentation, I am Billy Giles-Corti from RMIT University in Australia. I have been trying to champion the idea at my university about ethical innovation because, '**just because you can, does not mean you should**'. I do I wonder if you have got any thoughts on that? Is there an inevitability in there? Are there some things we should not be doing? And how do we make those decisions? We saw it with Cambridge Analytica and all this sort of disaster around, how technology was being used inappropriately to undermine democracy. So, my question is, how do we train our students – and not just our PhD students but anyone who can do things that cause harm – how do we train them in the concept of **ethical innovation**?

   A: Immediately I would say do what you are doing. I mean, when you are teaching foresight, you are teaching the human being to think not as the future as a place that you journey to, that is already set, and all you can do is just predict it or adapt to it. **It is rather something that emerges from what we do and what we think.** When you are teaching people to think in alternatives, that is a giant leap. Once you tell somebody 'hey, it can go this way or go this way', well, what is it based upon? It is based upon what we think, what we do. We keep thinking in education about how we make somebody fit in. Well, that made sense in the past but now we have so much ability to invent the future, it is not a question of fitting in as

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[20] The 'singleton hypothesis' has been proposed by Nick Boström, claiming that intelligent life on Earth will eventually form a "singleton" referring to "a world order in which there is a single decision-making agency at the highest level" (https://nickbostrom.com/fut/singleton). It could be a single government or an artificial intelligence that runs everything. Whether the singleton will be positive or negative depends on numerous factors and is not certain.

[21] See Glenn's book on Future Mind (1989) where he explores the potential for future integration between humans and machine drawing on examples in medicine and advances in human-like processing via machine in terms of speech recognition and other information technologies. While he touches on topics ranging from philosophy and religion to science and politics, the unifying theme is what he sees as the inescapable blending of machine-enhanced humans and 'conscious' artificial intelligence.

much anymore, it is 'well, what are we going to do?' I do not have a really crisp answer other than do what you are doing. I mean, these kinds of meetings – you just bring them up, discuss them.

Now, at the same time, one thing that a lot of people are not aware of (at least in my country not so much aware of) is the International Standards Organization (ISO). This is a beautiful phenomenon. The ISO standards, by the way, of AI governance just came out last month. Now, I am curious, not to embarrass anybody, did anybody in the room know that? No. We have systems of ethics, like the International Standards Organization, but a lot of people just do not know about it. It does not get the news. It did not shoot anybody, there has not been any wars. The ISO standards – you can teach your students about how ISO standards are created. Anybody can create a standard about anything. There is a process, it does not just happen. ISO standards on ethics or AI and governance exists as of last month within the International Standards Organization. I am in the IEEE, we are a little slower, ours is supposed to come out the next month or so, but there are systems in place for addressing such ethical questions. A lot of people do not even know them. There is an international system where they go through these ethical questions all the time. So, bring that into your classroom as 'what is going on?'. Anyway, this is an extremely important question. It should be brought up again and again. Thank you for the question.

2.3 Results of the working groups

This section contains the results of the three small groups working on-site, as well as those of one virtual group. In the concluding joint session, the groups presented their findings to all to see and to reflect upon. Online feedback and recommendations were also given by Jerome Glenn.

The participants were divided into three groups and asked the following three questions:

1. What policies are needed where Artificial General Intelligence (AGI) would support smart and resilient city development? (Group 1)
2. What services in the city would you like to see supported with the help of AGI? A real crisis has happened, for example total electronic blackout, and how would you need AGI to help in this situation? You can consider your own environment. (Group 2)
3. If a crisis happens (e.g., electronic outage/blackout), how would you need AGI to help in this situation in your home/neighbourhood? (Group 3)

Figure 6. *Andy Hines presenting the results of one of the groups (Group 3). (Photo: Joni Karjalainen)*

Group 1 – Policies for AGI-supported Smart and Resilient Cities

Moderator: Joni Karjalainen, Finland Futures Research Centre (FFRC), University of Turku

Group 1 was provided with the task of discussing **'what policies in the coming decades could be needed, or would need to be modified, so that Artificial General Intelligence (AGI) would support smart and resilient city development?'**

The conversation started off with exploring the overall principles and underlying values, which should aim to **ensure non-discriminatory use of AGI**. As a starting point, defining the big picture for the purposes where AGI is used is necessary, including consideration of potential areas that are left outside of the scope of AGI, to begin to consider the governance structures. These, in turn, would influence what types of data AGI could (or could not) use. As a practical consideration, the evolution of AGI is expected to sit against global developments and value contestations, such as those presently identified between the U.S. (West) and China (East). In fact, the main AGI tech companies would plausibly be owned and run by U.S. and China-based large technology corporations, as was the case with social media companies, which gave birth to the global platform economy (Google, Amazon, Alibaba, etc.). Such considerations would immediately influence the alignment of policies and related **power struggles** at local, regional, national and international levels.

Besides the overall framework, in actual day-to-day governance in how AGI is "implemented", different **legal and governance cultures** should be considered. In the course of actual policy development, duplication, overlaps and mismatches should be avoided, as examples of **(in)coherence**. If AGI were to be harnessed in positive ways, given the temporal evolution, related policies could be designed as **"living documents"**, in reflection and anticipation of the technological development. Human-AGI collaboration could become a novel interface and require consideration of the ways in which AGI can help. There could be **specific areas of application, broad** or **narrow**, so that AGI assists only in specific challenges or issues.

As the third area of conversation, the group discussed practical matters related to **ownership, management and failure situations**. From an urban planning perspective, a city like Helsinki or Turku, and the public sector overall, could anticipate how forthcoming private sector-led developments would be assumed to take place. On **the risk side,** as mentioned, are ownership issues. Contingency plans could be thought of for avoiding becoming too reliant on a single provider, or to anticipate what happens in the case the AGI system crashes. On **the opportunity side**, if the AGI is considered as a platform or infrastructure that others can build on, there could be policies that invite local entrepreneurs and developers to get involved. This way, AGI could be built for specific, tailored solutions, as has already been the case with app development in the smartphone era.

Overall, the group seemed primarily interested and concerned with the overall principles as well as terms and conditions for technology development, looking at the public-private interface, so that the AGI development could be governed successfully. However, apart from data and scope considerations, the involvement of citizens and their role was discussed less. Only, if such principles were in place, would it be possible to consider applied uses, that begin to serve the aim of smart and resilient cities.
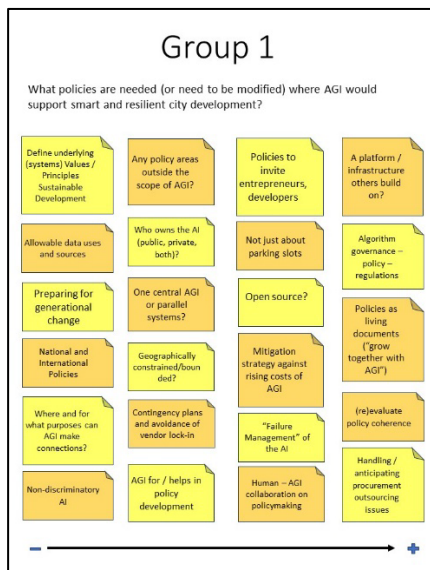
Figure 7. *Group 1 brainstorming on policies for AGI to support smart and resilient city development. (Photo: Tolga Karayel)*

Feedback and recommendations

Jerome found this group's results as very good thinking, some things he had not thought about. On the values part you can do a Google search on 'national values on AI'. Every country has them, surely Finland has them as well. There is a synthesis of all of them, done by Harvard University. If you do a search about 'comparison of AI values, Harvard University', it will probably show up. There is a lot of work done on that. So much that in the MP proposal – it was said we are not going to duplicate that, we will build on it. Glenn is satisfied that has been done quite well. The question of ownership is an important one. Ownership is going to be bizarre because, on one hand, if you create something and say 'I own that thing, I created it' but then it recreates itself in so many different ways, it is not quite the same as it was when you created it – do you still own it? You have got good questions and good thinking about it.

Then, Glenn phantasised that if he were the City of Helsinki, he would have it developed and owned on all projects and all evolution by the city itself, so you did not have to worry about whether Google leaves – or whomever – is that you would have the ownership. Glenn recommends that should be owned by the city. AGIs will create policies, no question, just like your autonomic nervous system creates, in a sense, policies on when you are going to digest your food, so to speak. It is a dialogue between humans and AGI on policies. One of the things that some people have talked about, as one of the first jobs to AGI, is the idea of giving it to figure out how to solve the Palestinian-Israeli conflict. Give it some difficult questions, but then humans would still be involved in implementation and the rest of it. AGI related policies as living documents? Yes, absolutely, the whole thing has got to be live and continuous, no question about it.

Group 2 – AGI-supported Urban Services

Moderator: Tero Villman, Finland Futures Research Centre (FFRC), University of Turku

This group addressed the question: **'What services in the city (resilient city) would you like to see, supported with the help of AGI in 2045?'**.

The discussion started on the proactive monitoring of residents' well-being through, for example, wastewater. Even now, for example, the COVID-19 situation has already been monitored through wastewater. Based on the keynote presentation of Jerome Glenn, this group also discussed the use of dynamic virtual environments to improve residents' well-being. On the other hand, some of the participants brought up the need to reduce technology or the so-called low-tech solutions, which would be used to positively influence people's well-being. Various early intervention solutions, based on early detection, were also perceived as significant. As a comparison, for example, the detection of tidal waves far out at sea, and not just at the beach, was used. This also involves forecasting climate and environmental changes.

The services could also effectively affect the carbon footprint/handprint, e.g., environmentally friendly autonomous public transport could replace cars that use fossil fuels. The discussion was left unfinished as to whether it would be desired for artificial intelligence, for example, to make choices on behalf of humans with strong guidance. As we learn more about human well-being, the decision-making of artificial intelligence can be used to choose what is best for society. Are these decisions based on individualist values or collectivist values? It comes down to the question of values and then who decides for this.

Solutions based on advanced artificial intelligence could contribute to removing social walls by improving the interaction between people and services. Various voice user interfaces and services that can work in real time in several languages were mentioned as a practical example. In terms of how AGI could empower people even more, the discussion was left unfinished. However, it was identified as one interesting topic of discussion.
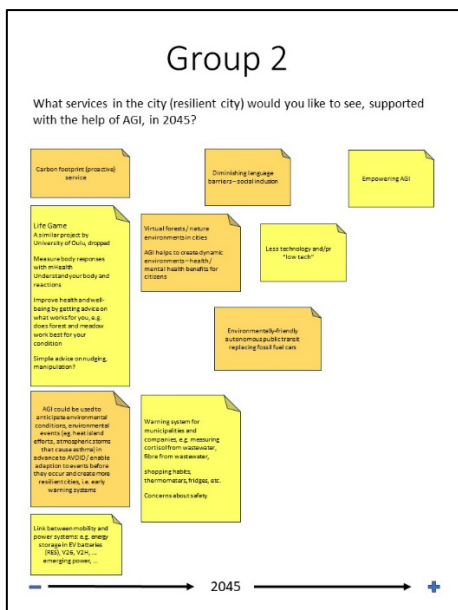

Figure 8. *Group 2 in discussion around AGI-supported urban services. (Photo: Tolga Karayel)*

Feedback and recommendations

Jerome Glenn wondered how you can avoid the proliferation of data about yourself. He wrote about this 30 years ago and said, 'if you've got privacy, good luck, I would not bet on it'. Now, the thing is, you do not have to link your name to your data. The artificial intelligence wants to know what you are eating, and your response, and your disease, and your treatment, all that so that we can learn better about medicine and health – that we have got to do, that is how we learn.

However, it does not have to be connected to your name, so you can still have privacy. But as related to the idea of 'owning your data', Glenn knows there is a lot of efforts to do that right now, it is just too easy to get around it. This system will free up your mind, that is a key element. Just like your mind is freed up because of your autonomic nervous system, so the mind of civilization will be freer than it has ever been before to invent itself.

The question of artificial intelligence choosing what is best for society is a political issue. These political questions and decisions are the reason why we have to have governments.

Group 3 – Home-based AGI support for Crises

Moderator: Saija Toivonen, Aalto University

Group 3 was provided with the task of **"If a crisis happens (e.g., electronic outage/blackout), how would you need AGI to help in this situation in your home/neighbourhood?"**

The group discussion resulted in six broad themes, in which AGI would be of home or neighbourhood assistance during a crisis. These were the following:
1. Warning Systems,
2. Ensuring the availability of energy,
3. Building Resilience,
4. Connecting,
5. Providing Information and
6. Monitoring and Decision-Making.

AGI was seen as a tool to help to detect the first signs of the crisis already when it is not visible for humans and gives a warning. Also, it can help to find ways to cope during the crisis and also to prevent the crisis. A lot was discussed on how it could help create new energy and restore it.

AGI was also seen as an important tool to connect people with each other, with family members but also to authorities and emergency staff, both locally and globally. It can also gather and provide information related to crisis and the circumstances. It was further seen as an efficient and rational decision-making tool during extreme events when difficult choices need to be made.
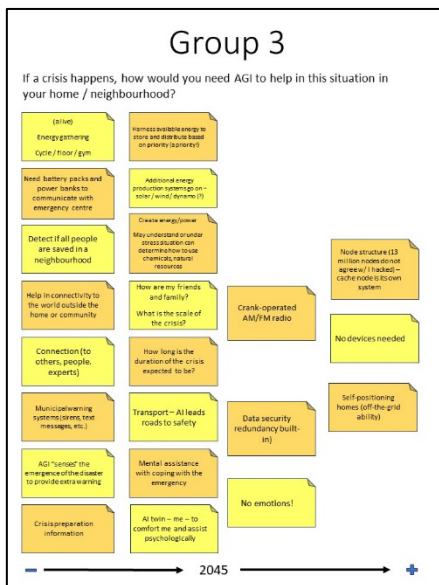
Figure 9. *Group 3 working on AGI assistance in homes or neighbourhoods during a crisis. (Photo: Tolga Karayel)*

Feedback and recommendations

Jerome Glenn considered the idea of the early warning system to be absolutely right. Again, with the analogy of the human body – when we are hungry, our body says 'hey, eat!'. The prioritization is very good. There is a lot that has being done now, as you know, with IBM's Watson but the human is still in the loop there. But, if it is being done for you, then by all means, it is worth taking advantage of. It is hard to improve on what the group presented – good job!

Group 4 – Engagement with all three questions

Moderator: Amos Taylor, Finland Futures Research Centre (FFRC), University of Turku

Group 4, the virtual group, was given the freedom to choose any of the three questions and comment on it. The **question "what policies in the coming decades could be needed, or would need to be modified, so that Artificial General Intelligence (AGI) would support smart and resilient city development?"**, drew the following comments: sharing wisdom of adaptation to climate change, securing ecological diversity and connectivity in cities, as well as addressing the numerous questions of privacy and information usage.

The second question, **"What services in the city (resilient city) would you like to see, supported with the help of AGI in 2045?"** elicited the following responses in the virtual group: mental health services, which could include mental health screening at schools and mental health coaching, personal health instructors as well as job seeking and temporary work, and short courses for employment. Customized cultural services, social network services for new citizens, local food production, help for energy distribution for houses, and cheap living and public transportation were also noted. A universal language to connect

people from different cultures and fields was interesting and insightful, and one participant noted that they do not believe the world will have AGI by 2045, but should consider using ANI in many different ways. Please see Figure 10 for a visual summary of responses to this question from the virtual group.

The third question **"If a crisis happens (e.g., electronic outage/blackout), how would you need AGI to help in this situation in your home/neighbourhood?"** include any crisis from an electronic outage to blackout, that would have a significant impact. The group was tasked with determining how they would need AGI to help in this situation. Answers ranged from enabling citizen activities, to fair resource distribution within the neighbourhood, and ensuring safety, or the feeling of safety, within the situation, to allow rational things to be done. Real-time traffic management and rerouting if accidents occurred would be essential AGI-support, although it has been acknowledged that some measure of this is already happening in the world today. Information and crisis management distribution, where instructions or guides are made available for the situation, would be essential in a neighbourhood crisis.
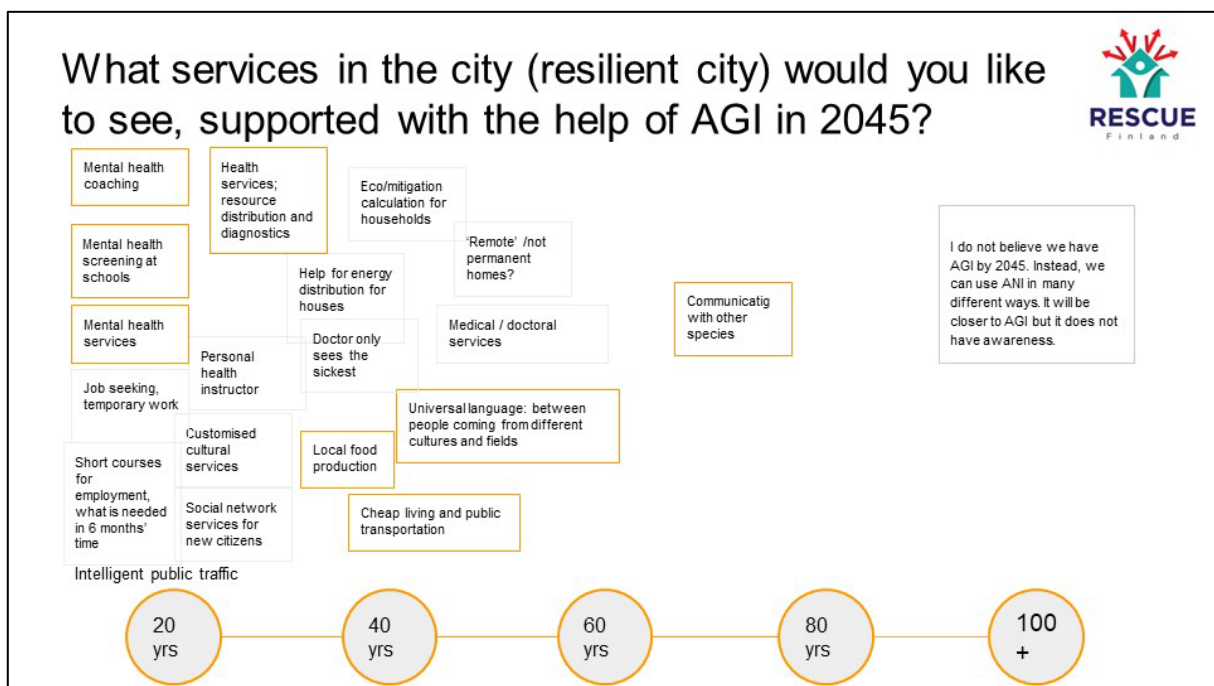

Figure 10. Responses to one of the questions from the virtual group.

3. MP SPECIAL SESSION 2023 ON FLOURISHING URBAN FUTURES TO OVERCOME POLYCRISES

This chapter reports Jerome Glenn's keynote and includes the Questions and Answers session, presenting the discussion with the audience. A futures provocation is also given and the results of all five small groups are provided in the third section of this chapter.

3.1 How and what to regulate to help cities prepare for crises and even polycrises in our age of digitalisation and fast developing AI?

Jerome Glenn welcomed the audience by saying that it was nice to be electronically back in Finland.[22]

Figure 11. Jerome Glenn delivering a keynote at the MP Special Session, highlighting the use of foresight to tackle polycrises.

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[22] Jerome Glenn has visited Finland on several occasions, many times within the FFRC Conference, or as last year, invited by the Finnish Committee for the Future in its World Summit in October 2022 in Helsinki https://www.eduskunta.fi/FI/valiokunnat/tulevaisuusvaliokunta/julkaisut/Sivut/the-world-summit-of-the-committees-of-the-future-2022.aspx. On the last-mentioned occasion Glenn also gave a keynote at the RESCUE Futures Clinique using the CLA methodology, conducted at Tripla, Helsinki. A report is forthcoming on that in the FFRC ebook series.

According to Jerome Glenn, one of the key ideas that futurists have been talking about forever, which is now about to get a little mainstream, is the idea of **anticipatory governance (AG)**. By that he means a system of rules, to make the right decisions about something that does not exist yet. This is particularly important with the development of artificial intelligence, which is still widely seen as a future problem.

There are two ongoing examples that are good to know, if there are problems in explaining anticipatory governance. One is the United Nations Secretary-General António Guterres's report called Our Common Agenda (United Nations 2021). Glenn claims that this is the most future-oriented anticipatory governance document the UN has ever produced. It consists of five foresight elements, and they have been assessed by the Millennium Project.[23] The Millennium Project experts hope that they will also be well implemented. The second one, which is also extremely critical, is **getting the artificial general intelligence right ahead of time**.[24] Again, anticipatory governance. The European Union has already approved the new AI rules, but that is not anticipatory governance according to Glenn, because that is already going on right now. It is partly anticipatory in the sense that they are anticipating that the artificial narrow intelligence (ANI) can get complex, which could lead to, among other things, an increase in fake. However, it is not anticipating a whole new phenomenon yet.

On the United Nations anticipatory governance, there are the five elements (Figure 12), each of which forms a network of how to make the UN an anticipatory body.
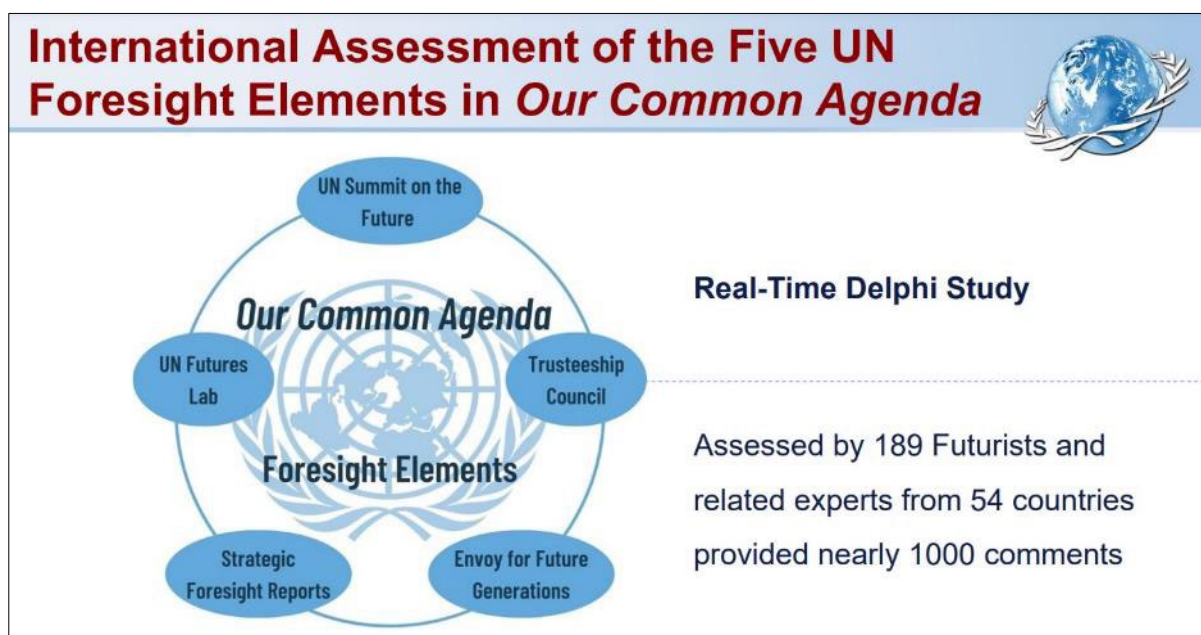

Figure 12. *Five elements of anticipatory governance for UN assessed by the Millennium Project experts. Glenn (2023).*

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[23] https://www.millennium-project.org/five-un-foresight-elements-of-our-common-agenda/
[24] This issue was already discussed tentatively in the 2022 MP Special session and briefed in chapter 2.2.

Right now, the United Nations is, to a large degree a resulting body − something happens in Somalia, and we do something, something happens in the Ukraine, and we do something. And yet, we tend not to have the United Nations as a system saying: 'How do we anticipate things coming up so that we can take advantage of the good, and prevent the bad?' This system is extremely important for the world and for anticipatory governance, and everyone should push their government to get these things done. Finland can initiate things in this common effort, for the UN Summit of the Future next year. There is going to be a meeting of governors, or ministers, this fall (2023) to plan for next year's summit (2024). Glenn urges that whichever country you are from, Germany or Finland or the United States, you contact your foreign ministry and say, 'what is your position on the future?' They will probably say `I have no idea`. This is where futurists should connect with their political systems. Great opportunity, Glenn hopes we will take advantage of it.

On various artificial intelligences

The next one is, of course, **artificial intelligence** (AI). There are three different kinds of AI, that often get confused: artificial narrow intelligence (ANI) we have today, and that is what the European Union has just agreed to new rules. The second is artificial general intelligence (AGI), this is the one where it acts in a sense like a human, in the sense that it can address new problems that it has not been trained for. It can use completely new strategies to get answers, it acts more like a partner or an agent than as a tool. Narrow intelligence acts like a tool, in that sense. Then artificial super intelligence (ASI) is what science fiction is talking about, that is where it gets beyond our control. The only way we can manage how 'super' evolves, is how the middle one – the general intelligence – evolves. This is where the anticipatory governance has got to come in. However, there are many voices saying that it is too premature to talk about artificial general intelligence. Is this the case? Leading experts are saying that we can have artificial general intelligence in five to ten years. At the same time, it will probably take five to ten years for the world to create a governance system for AI, so therefore we have to start working on it today.

How is this related to eco-smart-resilient cities? The easy way to understand this link is the human body. In the human system, there is essentially multiple narrow intelligence systems. The circulatory system – one purpose. The skeletal system – one purpose. All the different systems – one purpose. The exception to this is the brain. The brain has the multi-purpose. **We can think of the brain as like the artificial general intelligence, and autonomic nervous system as a bunch of narrow intelligences. With our cities and environment, we are going to do the same – connect absolutely everything that can be connected**. Initially with artificial narrow intelligence, Internet of Things (IoT), but then by the artificial general intelligence. Moreover, there will not be just one artificial general intelligence, but thousands. The different artificial general intelligences will talk to each other. Imagine the spyware from the United Sates and the spyware from China as artificial general intelligences starting to talk to each other. This interesting conversation needs a conference of its own.

On eco-smart-resilient friendly healthy cities

Connecting everything will not only apply to the built environment, but also to the natural environment and our bodies. We want to have sensors in the ground to know the condition of soil, sensors in the water to assess the water pollution. Some people want to take it all the way to the bodies, like Elon Musk. That will begin with artificial narrow intelligence but evolve into the artificial general intelligence.

The Internet of Things (IoT) is a gigantic issue that people are not focused on yet. A laptop can be invaded by spyware or by malware. Connected devices are entry points for bad behavior. And yet all the laptops in the world are just a small number compared to all the IoT entries in the world. **This is a gigantic security issue coming up, all as an integrated system of conscious technology**. **The human consciousness and technology will become an integrated whole in the same way**. When you call somebody on the phone, you are not talking to a person, you are talking to a machine, that talks to a machine, that talks to a machine, that eventually talks to some bones in your ears, that gets interpreted in your brain. Even though we are not really talking to that person, we experience that as if the technology disappeared and we are directly talking to each other. Now, imagine civilization as a whole being able to be like that. This means that **we are very vulnerable to artificial narrow intelligence and eventually artificial general intelligence.** The European Union's new rules on AI are going to help with this, but it is not going to solve it. This is because we do not know how long it will take from artificial general intelligence to evolve into the super intelligence. **Just like we have to take care of how our children grow up, because once they are adults, we have no more control, that is the situation with the AI.**

Figure 13. *The source, contents, and modes of communication will become fuzzy in human/AI interface. (Photo: Burgert Maree)*

Artificial general intelligence is able to address the novel problems, search everything worldwide, go through the IoT with its sensors, make phone calls, interview people, pass the Turing test without a problem, make logical deductions, reason similar to humans, learn from experience and reinforcement, and rewrite and edit its own code so that it gets smarter, and can share it worldwide. **We should make sure that it gets evolved in a good way.**

On polyopportunities

We are talking about polycrises, but we should also talk about polyopportunities. In Singapore, you can find pure chicken that is produced from genetic material directly to meat [in laboratories]. This way you do not need the whole animal. This is a gigantic direction coming up because we know how much the majority of the water we use in the world is for agriculture, and the majority of that water is used for growing food for animals, only some of which we eat. **There is a problem about the urban and agricultural conflict over water since the water tables are going down. If we can shift to pure meat, we free up a lot of water.**

A part of this multi-deal, is the **seawater agriculture.** Along the coastlines you can irrigate with saltwater. For example, algae, which is a great input to the growth of pure meat, can grow well on saltwater. When you take an area that is not producing green along the coastlines and is now producing green for pure meat instead of using it to grow animals – you create a double carbon sequestration. This is also valuable from a profitability perspective. When growing animals, you do not get your return on investment for years, whereas with pure meat, you get return on your investment every day, once it is in process. This is an example of a polyopportunity to prevent some polycrises.

For anticipatory governance **creating TransInstitutions**, **AI avatars, and local resilience teams** is important. These teams coordinate with each other ahead of time to prepare for possible emergencies and how to collaborate in such situations. The process includes listing the crises and opportunities, and assessing the impacts between them. This produces **an interdependency of understanding both polycrisis potential but also polysolutions.**

On the Millennium Project

The global futures intelligence think tank Millenium Project was established in 1996 − long before Jeffrey Sack's UN Millennium Project (Millennium Promise Alliance). The Millennium Project gets confused with Sack's UN Millennium Project, because it came out of the United Nations University, but is independent now.[25] The Millennium Project's nodes around the world[26] create the global-local dimension. You can collect the best content identified in each country, and then share it globally, which then again goes back to the local level. The Millennium Project is thus a **decentralised think tank**, whose nodes are autonomous and free to produce material and conferences of their own. The Millennium Project wants to create a **collective intelligence of the planet on the future, and learn from feedbacks**.

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[25] The Millennium Project was also discussed already in the Introduction.

[26] Sirkka is Co-Chair of the Helsinki Node of the Millennium Project. Other Co-Chairs are Toni Ahlqvist, Mikko Dufva, Juha Kaskinen, Osmo Kuusi, and Sari Söderlund. Please see the Helsinki Node website: https://www.millennium-project.org/about-us/nodes/helsinki-node/

The toolbox produced by MP, is the largest collection of futures methods (Glenn & Gordon 2009). The compilation consists of 37 methods. Besides that, the Millennium Project produces State of the Futures reports.   The forthcoming report will give an overview of the global situation of multiple challenges. The Millennium Project thinks that the **15 global challenges make the framework for understanding global change**. These 15 challenges are updated on a continuing basis, and it is shown they are interdependent. An improvement in one helps the others, and a problem in one can lead to problems in the other. It is like a system.
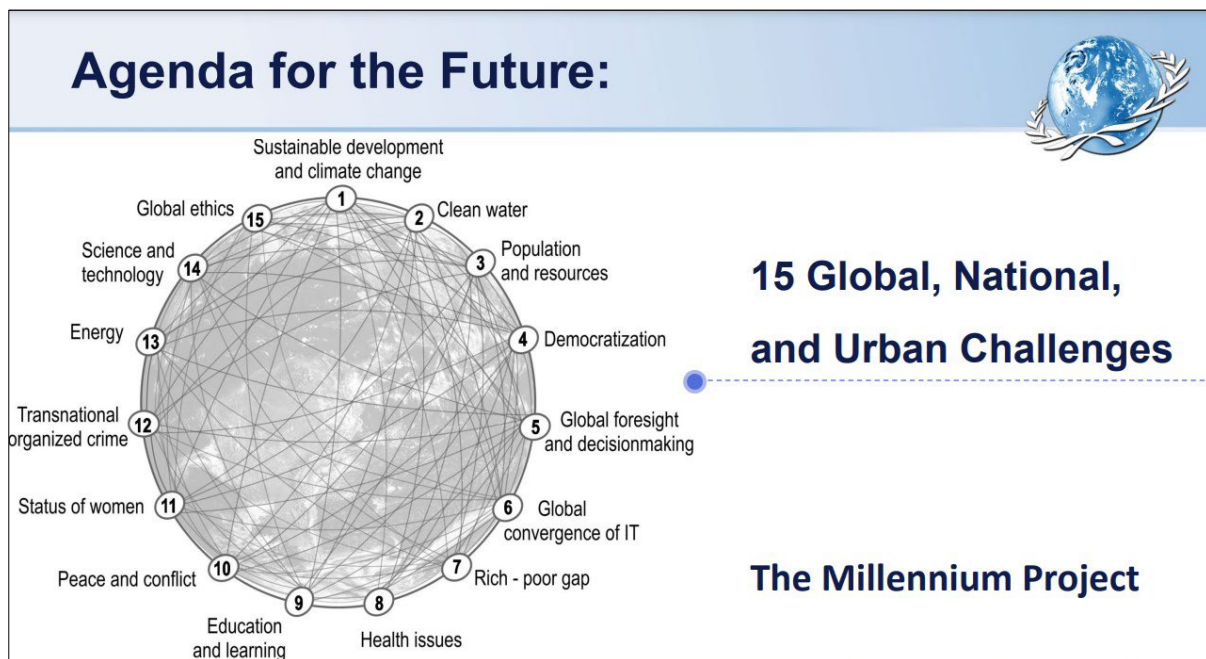
Figure 14. *The framework of the Millennium Project 15 global challenges and their interconnections. Glenn (2023).*

Questions and Answers

Q: Professor Markku Wilenius, UNESCO Chair of Transformative Learning, FFRC, University of Turku.

If we think about the quality of the smartness of these new `urban and other kind of structures` that are emerging, and if we put them on the map, we would have a global map where we could see where we are actually heading, and who is doing some interesting steps. What would your map look like?

A: We are actually in a process of working on this in the Millennium Project. What we have done, is we have 20 questions for artificial general intelligence (AGI) experts, 50 of the top experts, every name you can possibly think of out there. Some were interviewed in person, and some thoughts were collected online. We are in a process of putting it all on the table, and we want to sort through it, we are not saying `this approach is right` or `that approach is right`, we just get it all on the table. After that I will be able to answer that question a little better. If I understand the nature of your question, you are asking, correct me if I am wrong, **where is the concentration of the talent and the work that will do the breakthroughs on artificial general intelligences**, is that essentially your question?   You have Alibaba, well, China is one of the key players, and they are in a race, just like the United States is one of the key players in a race.

You have the IBMs, the Open Mind, and the Deep Mind, but you also have the European Union that is involved as well. Japan is involved, too.

However, here is a couple of things that are not being stressed enough: First, organized crime is at the state of the art in this field too, with cybercrime being a prominent example. We are trying to figure out how you can get organised crime, in some way, at the table in these future negotiations. This is because if all the countries are doing everything right and we have a good governance system, and organised crimes are doing the illegal stuff again, then those general artificial intelligence agents keep messing around. We have got to head off that activity as well as the general. Second one is the alignment problem, as you may know. It is one thing to say that you want to have artificial general intelligence to do A, B, and C, fine, what happens if A, B, and C, is in conflict and contradiction? How does it work out? How does the alignment work with all of this? One of the top guys, Eliezer Yudkowsky, he has been working on it for 10 years, and says 'I give up'. Then there is Connor Leahy, that has just come in and says 'okay, I am going to start working on it'. We have got to support these activities fast, otherwise we lose control in the end. It may turn out it will all be okay, but it is like we are not in control completely of nature either, and nature is still giving us oxygen and food and so forth, so it may turn out okay even if we do not do the anticipatory governance right. However, I think that we should.

We will make available to Millennium Project nodes around the world, this assessment of the AGI, which includes exactly your question, 'where is the best stuff going on right now?'. [27] Now, the trouble is that a lot of people will not tell you that. Like, for example, China is in a race, because they said they are going to run the game in 2030. Russia – Putin – has already said that whoever wins that race, rules the world, so the United States is in there, Japan is in there. You have these classified systems in there, and how well they are doing, I do not know. In this situation, **usually military research is ahead of civilian, but in this situation, civilians may very well be ahead.** One of the things I would recommend you all to keep track of is **YouTube**. We have put into YouTube AGI and up will come a bunch of stuff. **Take a look underneath**, where it will say, 'one day ago' or 'one year ago'. I am reviewing it almost every day, because the interactions are going very fast. What we tended to believe a month ago, is not what we believe today. There is an interaction going on, very fast.

Another one I would keep an eye on, of course, is **Twitter.**[28] You have Yann LeCun, the French guy, and Eliezer Yudkowsky having a violent argument about alignment going on right now on Twitter. We started studies on this a few months ago but the state of conversation has really advanced very fast. **Where the concentration of talent is, is all over the place.** However, I am not convinced that the large, giant models that people are talking about – the GPTs, the GPT4.0s and so forth – will be the breakthrough. This is because, the way we humans think, we build our database on the fly. I think artificial general intelligence (AGI) could very well be a set of algorithms that generate, or have access to, a large-scale database, as they need it. However, they are not necessarily all of that, because if we go with the giant systems, the electricity requirement and the computer requirements are going to be gigantic. It is a long-winded answer, I hope that gets close to what you were asking.

Q: Francisco Jariego, researcher in strategic foresight, technology and innovation, based in Madrid, Spain.

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[27] https://www.millennium-project.org/transition-from-artificial-narrow-to-artificial-general-intelligence-governance/
[28] At the time of writing this report, Twitter became X.

I have just one question. We have plenty of challenges, plenty of opportunities, but we have a challenge of communications to society. We have polarised the situation where people enter into hysteria, for example, with this question of the artificial intelligence right now, but tomorrow there will be another thing. **What do you think the Millenium Project and the futurist communities, etc., can do more to communicate into society, which is completely and fully dominated by dystopia and science-fiction, etc.?**

A: Well, obviously, conferences like this, but we also all have access to social media. We are not engaging with the press as much as we, as I, want to, and I am probably as guilty of that as anybody. We also do not talk to our local school systems. When we teach a subject in school, we automatically say something about the past of it, where it came from, but we do not automatically add what are the future possibilities, e.g., what's the future possibilities of arithmetic? That was one of things that blew my mind as a kid in seventh grade, when the math teacher said that all of math has been invented, I went 'what?'. There is geometry, there is trigonometry, but what else is to be still invented? Another one, that is not too popular, is that we have to figure out how to address **information warfare**. When I say information warfare, I do not mean propaganda, e.g., 'you guys are a bunch of nuts'. I am talking about **cybercrimes** and **cyberespionage**, because that is where you actually try to destroy something. Information warfare is where you manipulate the lines of trust. So a person thinks it is reliable when, of course, it is not, and is manipulating your judgment and your views to be more polarised. One of the ways in which information warfare works, is to take a society, and see where are the cuts and fissures already. It is not like the information warfare is inventing them, but finding them. It is to turn people from 'I do not like X' to 'I hate X' and to 'X is the enemy'. And that, in my judgment, is one of the most important problems today. I am not seeing futures taking this on yet.

Q: Mikko Dufva, Sitra, Leading foresight specialist at Sitra, and Co-Chair of the Helsinki Node of the Millennium Project.

Because we are thinking about resilient urban futures, we of course have to think about also vulnerabilities and things that might go wrong. I am wondering **what kind of blind spots we might have about AGI and smart infrastructure?** For example, what if we do not have electricity or information networks the way we have them now, because, well, a lot of things might happen? **Are we building a very vulnerable system that we can govern but that does not work?**

A: Yes, it is a very vulnerable system, but there is an analogy here. We do not rely on governments or corporations to protect our laptops. We buy corporations' anti-virus software and protection, so **we have decentralised the responsibility** for a lot of malware activity. We can also decentralise a lot of that as we go forward, for example how we use all of these systems, as much as possible, to make it also possible for an individual to have systems that alert themselves. This is because it is too much work for governments to do all of this, it is just too complex. **The more we decentralise individuals, so that you have automatic software in your own systems, that can help you protect, the better off we will be.** One of the blind spots is what I have just mentioned, the idea of organised crime invading in a variety of ways, with new forms, software, because they have enough money to buy the best talent in the world. They know how to set up shell corporations, they are pros at this. You think that you are maybe working for the good guys, figuring out how to identify the problems we are just talking about. But what they are doing, is then teaching organised crime how to get around those solutions. **I do not think we are paranoid enough about artificial intelligence.** I would say that **artificial intelligence run by organised crimes in different syndicates is the biggest blind spot we have.**

3.2 Futures Provocation for Flourishing Futures Policy

A futures provocation for flourishing futures policy was given by professor emerita Sirkka Heinonen. A futures provocation is one of the key elements of the futures clinique process (Heinonen & Ruotsalainen 2013). Similarly, as in 2022 Millennium Project Special Session (see Chapter 2.1), the participants were encouraged via a futures provocation to enhance their futures orientation. Such a provocation means calling forth (Lat. pro = for + vocare = call) openly various ideas about futures. This includes the following futures stances:

- to think and look differently
- to think about alternative options
- to think systematically → adopt a systems view and broaden the horizon
- to think about causes & effects, interconnectedness, root causes…
- to think boldly
- to open futures for preferred futures (and to close futures for undesirable ones)

Accordingly, a futures provocation is also a call for action, i.e., to have an impact. Enhanced futures orientation means the capacity to look longer in time horizon and to adopt peripheral vision (Day & Schoemaker 2006). A futures provocation calls for immersion in possible, better, alternative, and surprising futures. Its aim is twofold: 1) on one hand we have a vision which is demonstrated through a narrative for a preferred future – *Green, digital, inclusive and resilient Built environment 2050*[29]; 2) on the other hand, in today's reality we are living in a VUCA world and crisis society where the vision is still on the horizon (Heinonen et al. 2022). The elements of the vision and the narrative describing it form an ample cornucopia: circular economy, renewable energy, carbon neutrality, adaptability, accessibility, biomimicry, vertical farming, co-existence of species, inclusive areas, communal spaces, human-oriented smart houses, extreme-weather-conditions proof houses, and wellbeing entrepreneurship.

[29] See the whole narrative in chapter 3 in Heinonen et al. 2023a.

Figure 15. *Sirkka Heinonen delivering a Futures Provocation to participants at the Millennium Project Special Session. (Photo: Tolga Karayel)*

The futures provocation ended in stating the aim of this session to be: 1) to immerse in a polycrisis and ideate policies, practices & recommendations for coping in it, and even flourishing; 2) to concretely reflect on what kind of a built environment, cities and land use we should have in order to be resilient; and 3) to turn polycrises into 'polyopportunities', with the help of renewed futures empowerment, commitment and agency at various levels by all stakeholders. The futures provocation in this session invited the participants to test the crisis resilience of cities through immersion in specified polycrisis contexts.

The futures provocation was followed by a futures window of radical innovations for flourishing urban futures. The futures window − a cavalcade of visual weak signals (Heinonen & Hiltunen 2012) − was shown as stimulation, illustrated through vignettes. At the same time, the narrative on urban futures and nature-based solutions was shown as posters on the wall and as hand-outs to escort the participants to immerse into joint co-creative visioning for resilience (see Appendix 2).

Figure 16. *An image from the Futures Window at the MP Special Session (Photo: Sirkka Heinonen)*

3.3 Results of the five working groups

Interactive moderated elaboration of the topics and tasks given took place in five small groups. The results of the Futures Clinique working groups are presented below, in ascending group order. Participants in the groups are listed in Appendix 1. Each group report follows the same order, namely the phases that were adhered to during the workshop. Observations by the editor and commentators have also been added. The groups worked with different concepts during the workshop. These are the key elements around which the group working centred:

- Individual crises and creation of polycrises
- Elements that could help cope with the polycrisis
- Potential solutions to the polycrisis

It should be noted that the concept of polycrisis does not have one clear definition. In global context Lawrence et al. (2022) define polycrisis in the following way: "A global polycrisis occurs when crises in multiple global systems become causally entangled in ways that significantly degrade humanity's prospects. These interacting crises produce harms greater than the sum of those the crises would produce in isolation, were their host systems not so deeply interconnected". (Lawrence et al. 2022, 2.) Furthermore, in another paper they claim that the way they understand polycrisis includes only crises that combine three or more systems that are interconnected (Lawrence et al. 2023). Conception of a polycrisis in this futures clinique differs from their definition. We consider a situation where two or more crises emerge at the same time to be a polycrisis. The argument for our conception is that polycrises also cover the combination of

two crises. If one wishes to address specifically such a combination, it can be called dual crisis. However, dual crises also fall into the category of polycrisis.

In the concluding chapter following the group reports, a matrix has been added to show the different approaches taken by the various groups. The aim is to highlight similarities and differences in the respective approaches (chapter 4).

Figure 17. Group work during the Millennium Project Special Session at FFRC Conference in Turku. (Photo: Tolga Karayel)

Group 1 – Polycrisis of "Power Blackout" and "Social Media 'health bomb'"

Moderator: Kati Lehtiö, University of Turku

Phase 1 – introducing the topic and defining the polycrisis:

The group was asked to choose a second crisis, in conjunction with the given crisis of **"Total continuous power blackout"**, to create a polycrisis. Questions around the given crisis emerged before the group could decide on a second crisis, and the moderator decided to clarify the nature of the given crisis first before moving on to choosing a second crisis. One group member then suggested to add the crisis **"Social media creates a 'mental health bomb' and the public space disappears"**, a suggestion that was wholeheartedly supported by the group. Thought-provoking discussions around the first crisis (on its own) developed, with an analysis of the possible natures of the power blackout as well as its consequences. The moderator guided the discussion back towards the choice of the second crisis, with the group still in favour of the crisis **"Social media creates 'mental health bomb' and the public space disappears"**. Before attempting to find solutions for the polycrisis, the group felt the justified need for a discussion around the traits of

both crises first. The group came to the conclusion that the cause of the power blackout is not as important as simulating that a collapse has just happened, which needed to be reacted to, and solutions be figured out. The moderator reminded the participants to keep the vision of inclusive, green and digital cities in mind when formulating solutions.

Figure 18. Participants working together in Group 1. (Photo: Sirkka Heinonen)

Phase 2 – choosing elements to help cope with the polycrisis:

By now, the group was already more familiar with the theme and started to produce more detailed insight into the immediate outcomes of the polycrisis. The group then moved on to the next phase, which involved **choosing an element** (on the separate handouts) they would be able to utilise/make use of to form solutions and policy recommendations. One of the participants described the possible immediate outcomes of a polycrisis in society in more detail, which helped the group to imagine a society in this type of polycrisis. Mention was made of both the elements of **decentralisation and smaller units** as well as **citizens' emergency supply skills** (in part due to police and emergency services that would not be available in a crisis like this), and the group concluded that the two elements were intricately related and would be hard to separate and choose only one. The group, therefore, **agreed on both decentralisation and small units as well as citizens' emergency supply skills as chosen elements** that could help cope with the polycrisis. The group acknowledged it was a challenging combination but chose to move ahead. One participant, for perspective, mentioned that there are elements of decentralisation already present in Finland, e.g., wind energy, but that it was heavily dependent on weather, and therefore not so secure in a polycrisis.

Phase 3 – finding possible solutions for successful societies:

In the third phase, the group started discussing short-term solutions. Within a few minutes, the group imagined what **communication** could look like in their constructed polycrisis. Communication would likely be different, with **cascading information in society**, occurring from units (e.g., families) to communities. Face-to-face communication would be necessary. You would need to literally open the windows to communicate with your neighbours and walk to central areas for communication. In the long-term, new communication methods need to be developed (independent of electricity). The group imagined how people would act in isolation and amid a power blackout. The group argued that people who are struggling with the mental health bomb crisis would, first and foremost, think about their survival, and move out to where they need to be to be safe. **Restrictions in movement** might also exist, which would need to be considered.

The **issues with energy** were discussed next, including the **need for a closed electricity source** in a crisis like this. Currently closed electricity systems are connected to the whole system (e.g., Nordic system), and that connection would be broken, rendering the current closed electricity systems unreliable. Building a renewed system for local electricity production could be a mid-term solution.

Other relevant sectors in society were **food and food distribution** in general, as well as (local) **heating** (systems). People should **eat anything edible** they can find, more specifically plants. Local sources at hand would be needed, although local sources in a large city would be a challenge. Applying the element of decentralisation, the group came out with the solution of **accelerating of spaces where garden crops can be grown and cultivated**, as well as sharing the crops. There were critical voices about the suggested food system as well because it takes time to build a whole new food system, especially when the blackouts are recurring, which would hamper the momentum to build these food systems. However, exchanging resources would be at least one kind of solution, and something to start addressing the need for food within a polycrisis with.

Heating, especially in certain places where it gets really cold, would be essential to consider. If the blackout is continuous or interrupted, it would change the response. Although, the systems to operate within the first few hours could be very similar, e.g., sharing food, etc.

In such micro-communities, **diverse skills** would be needed, including engineers, technical experts, energy experts, food experts, and **inter- or multidisciplinary skills** in general.

Many of these suggestions can be considered as **short- to long-term**. If the power blackout is intermittent, **confidence can be gained** in the short-term when these solutions are implemented, and confidence would assist in developing or re-developing the long-term strategies. The group discussed the timeline for a while and thus the roadmap started to form almost intrinsically. Regarding long-term solutions, communication and commuting were discussed again. **Transportation** would be considered a vital resource, because communication cannot happen as we are currently used to. Bikes and scooters often need batteries, but the manual versions could work. **Shared biking** could be a solution to form a bike system.

It was mentioned by one participant that it is interesting how they were thinking about small units, but not asking and questioning how these small units were connected. Also, a question was raised about what the base of communication would be if power is only intermittently available. The **development of new types of communication** would need to be considered.

In the long term, new types of communication and a newly developed confidence were mentioned. The **group's solutions remained focused on the decentralised units** mentioned early on. A successful society within this kind of polycrisis would be defined as a **self-organised, bottom-up society**, where

people are stronger and more resilient, and they have realised they do not need a top-down hierarchical structure. One participant summed up that it would be an **anti-fragile society** where the society grows stronger after setbacks during the polycrisis. The group discussed the notion that, in history, crises have created opportunities and innovations came from collapse. Reference was made to China, where crisis have created opportunity. It was also mentioned what a pity it is that humanity has not learnt how to change without a crisis. It was emphasised within the group that, although there were great solutions, **communication would be key**, and communication should be able to take place between the hubs where solutions lie.

In the mid-term to long term, it is expected that every community would be different, so overall **diversity would increase**. That would lead to new ways of communication. Society has survived the first impacts of the polycrisis, but one of the negative impacts could very likely be a mental collapse, **a new trauma** within communities. New medical systems, a new health system, would be needed as part of the solution. In the long-term, people have learned how to adapt, and there is a new kind of medical system built on experienced trauma. In the short-term, the crisis was a trigger, which was survived, the mid-term and long-term will be characterised by discussions on how to continually improve the system(s).

Phase 4 – naming the approach:

Lastly, the approach was discussed, describing the way in which the process of solutions for this polycrisis has emerged. Suggestions ranged from 'from crises/big collapse to great innovations and transformations' to 'surprising alternatives'. It was, therefore, summarised as **Surprising Alternatives**, or as one participant wrote in the headline section, the **"Anti-Fragile Society"**.

Feedback and remarks

Sirkka Heinonen highlighted the futures-resilience and anti-fragility that the group produced in their approach to the polycrisis they constructed. Heinonen stressed that futures-resilience is about learning from crisis, not just to cope with it and that communication, in this particular polycrisis, as well as in any other polycrisis, was important. The strength in this approach lay in the communities who communicated in smaller units. Heinonen highlighted the agency that is needed for an approach like this, to create a futures-resilient urban setting that would be resilient against polycrises, emphasising that it was agents who need to make it happen, and these agents might not even know themselves that they are capable of making it happen.

From the audience, Mikko Dufva was impressed by the approach to the polycrisis and asked if he had to wait for 30 years to see this happen. Viivi Koivuniemi highlighted that the different components of the group's polycrisis is, in actual fact, helping each other. On this note, Heinonen highlighted that we tend to believe that many crises together always strengthen the negative impacts, but that it is also possible for one crisis in a polycrisis to lead to solutions that could overcome the other crisis – added impacts could be positive, negative, or complimentary (so, not always negative).

The second crisis of **"Social media creates a 'health bomb' and the public space disappears"** was **not delved into deeply**, where the time available could have been the issue. It would have been insightful to circle back to consider the second crisis more in conjunction with the first crisis.

Communication, transportation, and food systems appeared to be the **central points of discussion**, which was deemed by the group as the focus points in an effort to address a polycrisis of this nature.

Table 1*. Roadmapping results of Group 1.*
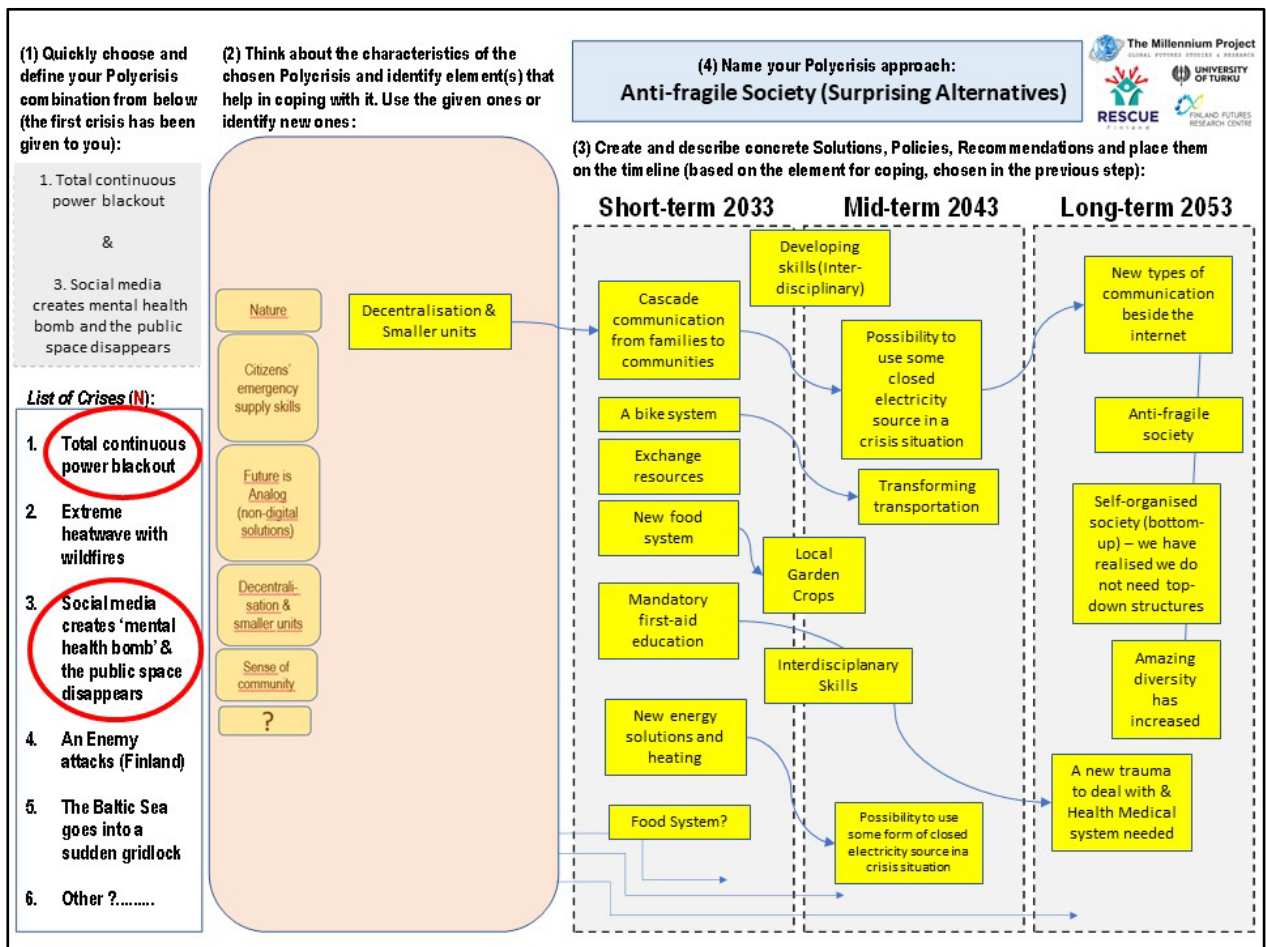
Group 2 – Polycrisis of "Extreme heatwave" and "Power blackout"

Moderator: Viivi Koivuniemi, University of Turku

Phase 1 – introducing the topic and defining the polycrisis:

The first crisis, **"Extreme heatwave with wildfires"**, was given to the group beforehand. One participant suggested choosing a second crisis that was not closely related to the given crisis to make the polycrisis more interesting. A question was raised about whether the simulation of the **polycrisis happens 'right now'** (in real time) or only at the end of planning a successful response, to which the moderator replied that the crisis happens 'right now', in this Futures Clinique, and responses are formulated in response to the simulated polycrisis.

To highlight the variety of choice in response, as well as the threat of one of the crisis, namely **"An enemy that attacks Finland"**, a participant mentioned the vulnerability of the banking system in Sweden (BankID), where all currency has become digital and a wipeout of bank infrastructure would lead to citizens not being able to buy food, have no access to ID systems, and even to call for help without identifying themselves electronically.

Next, the participants were to choose a second crisis to combine with the first, to create a polycrisis. One participant did not want to engage with the crisis **"An enemy attacks Finland"**, whereafter a suggestion was made to combine the first two crises on the list, namely **"Total continuous power blackout"** and **"Extreme heatwave with fires"**. Participants were in favour of the choice made. One participant mentioned interesting and relevant questions that could hamper the **flow of information within the polycrisis**, for example: What is the status of health? Where is the fire heading to? Where should one go to? How to deal with the polycrisis? How do you keep your food cold? How do you remain cool when your air conditioning is off?

Figure 19. Participants working together (Group 2). (Photo: Tolga Karayel)

Phase 2 – choosing elements to help cope with the polycrisis:

The moderator encouraged the participants to consider the characteristics of the polycrisis, as well as the elements that would be used to help cope with the polycrisis.

Firstly, the characteristics of the polycrisis were discussed:

People would probably **move away from urban centres**, due to the lack of resources like tap water, although the individuals in the countryside, where the wildfires are taking place, would also be moving

away from their areas. This would likely result in an **internal displacement**, or displacement across borders. The moderator mentioned that the focus of the heatwave and wildfires should remain in Finland and not across borders. Water pumps and basic infrastructure would not be working. A **mass mobilisation of rescuers and military**, also international support, providing assistance to citizens in the polycrisis, would likely occur. **Information lockout and information loss** would likely be a reality, because practicalities, like the storage of batteries, might not have been attended to in time. Panic, violence and looting might be characteristics to consider in the polycrisis.

Secondly, elements to help cope with the polycrisis were discussed:

Citizens' emergency supply skills and **sense of community** were considered as possible elements to help cope with the polycrisis. One participant asked whether the characteristics of the polycrisis, as discussed, would happen in a particular order or randomly, and whether the focus of the group should be on the whole of Finland or a specific region or urban area. For example, urban areas might be more concerned with the issue of smoke rather than the fires itself, as well as the lack of food and cool areas to go to. **Bomb shelters were suggested** as potential solutions, due to temperate climate within these shelters, but overcrowding and lack of ventilation might be subsequent concerns.

The element of **"sense of community"** was offered as valuable, as it would assist in addressing the displacement that occurs. Moving due to the wildfires would result in **loss of community**, and mobilisation of police and military would require trust to be placed in a lot of people in uniform, and the military, and a reliance on them in the midst of a loss in community. The moderator suggested that the group should start with the element of **"sense of community"**, then the group could circle back to consider other elements, if time allows. One participant also asked for clarity on the crisis **"Total power blackout"** and suggested that the crisis be defined as total, not recurring, because it would change the nature of the response to the polycrisis if the blackouts are recurring. It was noted that recurring would be simpler to address than a total power blackout, as is similar in Ukraine, where the access to electricity is intermittent and unpredictable. The group decided on the latter, recurring blackouts, as a characteristic of the polycrisis.

The **aspect of different communities, in particular the vulnerable** groups in society – for example the elderly, the children, the homeless – and how they would be affected by the polycrisis, were mentioned. The fires in San Francisco were brought to mind to highlight the dangers to vulnerable groups, like the homeless. It was agreed that these groups should be especially considered within the development of the policies for the future, to secure their safety in any type of polycrisis.[30]

Phase 3 – finding possible solutions for successful societies:

A solution of **mobilisation** was offered, which resembled the Swedish warfare model, namely full mobilisation – in Sweden, if you have ever been trained in the military, you will go fight, and if you worked for the public sector, you will be placed somewhere where you will work with food, water and sleeping spaces – it

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[30] The sense of community is an integral part of resilient community development, rather than mere resilience planning. Resilient community development deals with self-determination, equity, and deeper long-term socio-political determinants of vulnerability. According Wardekker (2021) resilient community development is underdeveloped while resilience planning is well represented in urban climate adaptation research.

is decided for you. Applying this logic to the polycrisis, the **creation of assigned posts and positions for a crisis** was recommended – every citizen has an assigned position, not just the military, but for all citizens. Everyone above the age of 16 or 18 knows what they will be required to do when a crisis, or a polycrisis, erupts. Policies exist already for the military, during a crisis like a war, but not for civil crises. One participant mentioned that one form of that already exists in Finland, e.g., an association responsible for the bomb shelters in certain areas, areas or regions. This should be extended to fulfil other roles in a crisis too.

The moderator suggested that the element of **"emergency skills for citizens"** should be separated from the before-mentioned policy of **"mobilisation"**, as they do not necessarily have to be intertwined. **"Emergency skills for citizens"** could be specific skills such as the ability to clean water, if clean water is not available, as well as utilising nature – **skills that require basic survival[31]**, should it be necessary. The government could **provide funding for education or short courses** on these skills, which could even be mandatory for every citizen. Certificates could potentially also be awarded after completion of the course. **Dialogue skills** to support the element of **"sense of community"** should also be addressed in these short courses for survival.

One participant suggested also **considering non-humans** as part of the policy development process in a polycrisis. More greenery, minimising heat, and providing water, would be essential in addressing the polycrisis to give optimal support for non-humans. **Urban planning for non-humans** would be very important in the long-term. Concrete, metal, and glass, to name a few, are all elements that adds to heat, which would need to be reconsidered in urban planning. Would wood cities, for example, be possible? **Streets developed as orchards** could also supply food in a polycrisis.

One participant, as an aside comment, mentioned that urban planners choose male trees over female trees to minimise fruit production (and, thereby, messy streets), but hay fever has increased as a consequence. This highlighted again the importance of well-considered urban planning for the future.

One participant asked whether the **urban environment could be better built** to be better responsible during blackouts. Mini-batteries, mini-nuclear power plants in districts were mentioned. The question was posed on how these mini-nuclear power plants would be protected against fire.

A change in infrastructure was emphasised again, not only for the total power blackout but also for the smoke that would be present due to the wildfires. Smoke would need to blow through cities, not remain collected within the cities. The moderator asked whether the change in infrastructure would allow to capture the smoke, the carbon, to create power from it. One participant mentioned that **canals** could be efficient in supplying much-needed water in the polycrisis. The **impact on biodiversity**, when building these canals, was also raised as a counter-argument.

Phase 4 – naming the approach:

The group revised the solutions that were considered in the previous phase in an attempt to define and name their specific approach. **"Paw Patrol"** was suggested, a reference to a television programme for smaller kids at home but also a reference to the focus on non-human life. One participant mentioned that the element of **"sense of community"** was not delved into depth, but it was argued by another participant

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[31] This comes close to survivalism. For example, Marjukka Parkkinen (2021) has studied how practicing survivalists deal with the uncertainties related to the future in her article "Engagements with uncertain futures – Analysing survivalist preparedness".

that the **mobilisation** of individuals would contribute to a sense of community, as there would be individuals to assist and guide everyone, accordingly, including the most vulnerable.

"Capable Communities" and **"Cool-headed Communities"** were suggested as approaches, acknowledging that these names do not capture all of the discussions that have taken place, but gives a succinct summary enough.

Feedback and remarks

Sirkka Heinonen applauded the idea of cool-headed communities, noting that it resembled a true futures-resilient approach, with nature-based solutions. One participant mentioned that it was difficult to imagine a polycrisis like this playing out in the Nordic countries, although similar crises with heat waves have occurred in Sweden in the recent past. It highlights again how, even during a Futures Conference with future-minded individuals, it can be difficult to let go of reality and imagine out-of-the-ordinary crises occurring.

The mention of canals as a possible way to mitigate crisis but also having severe impacts on biodiversity is again a reminder on how inter-related and complex systems are, and how solutions would need to be clever and well-thought through, to balance all systems and aim for a positive overall effect.

Table 2. *Roadmapping results of Group 2.*
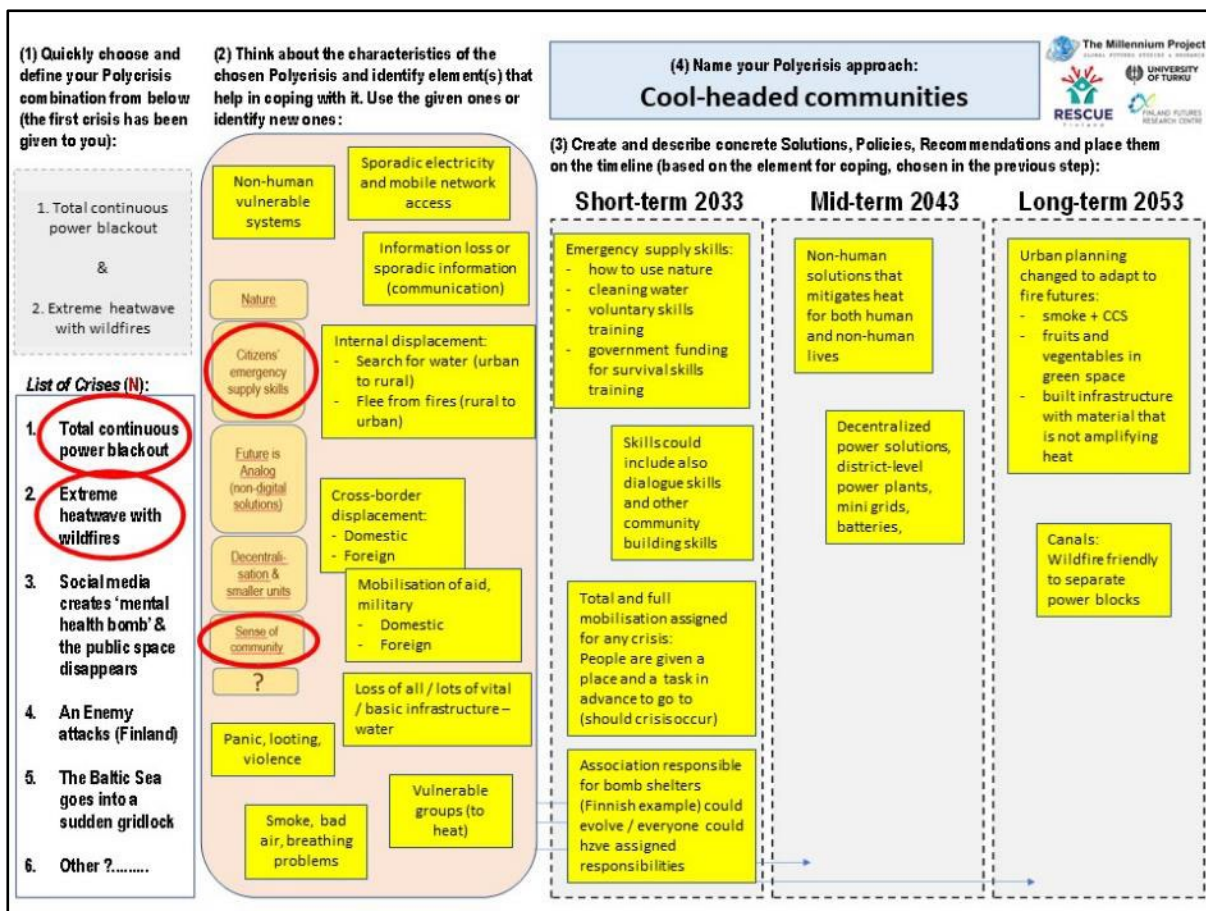
Figure 20. *Participants presenting their results (Group 2). (Photo: Tolga Karayel)*

Group 3 – Polycrisis of "Social Media 'health bomb'" and "Organised Cybercrimes"

Moderator: Elisa Oinonen, University of Turku

Phase 1 – introducing the topic and defining the polycrisis:

The moderator started the discussion by defining what was meant by the given crisis, namely **"social media creates a 'mental health bomb' and public space disappears"**. The moderator also encouraged the group to choose a second crisis to combine with the given crisis, in order to form a polycrisis. One participant suggested that the group **delve a bit deeper into the given crisis first**, to understand it better, then to consider which second crisis could be the most viable for a polycrisis. The group raised the following topics in their attempt to understand the given crisis better: **decentralized (even tribal) communities**, giving rise to nodes, **separate realities and social bubbles** in which citizens would find themselves, combined with the **tension between the open public space and people's own social bubbles**. The last characteristic implied that people are not connected to their environment, when they are living in their isolated social media bubbles.

The discussion continued with the different consequences of social media and how it creates **health problems and identity issues**. Young people who do not yet recognize their own identities compare themselves too much to the "perfect" images shared in social media. The term **'avatar dysmorphia'** was mentioned, where young people modify their own bodies to fit the profile of their skinny avatars better. This leads to a **problem of authenticity**, being different, being the authentic self, and losing oneself in the process. The implication of the negative effect of social media and the public space disappearing would result in everyone staying inside.

The positive sides of social media were also mentioned. A **sense of belonging** could be found in smaller tribes and communities, where one would not need to follow the mass media and the majority opinion.

When comparing the public space with social media, in reality the **public space serves only some people, whilst social media can serve as a platform for smaller groups**. Social media creates more stickiness, and the virtual world matters more, especially to younger people. Everyone can create their tribe and be part of it. Social media increases choice but it can also take you out of the public space. The question was asked whether our public space can be virtual. Also, cyber criminals were mentioned in the context that they can steal more than just your money, but also your identity, whereafter they are able to trash your identity online, and many more things. For the younger generations, the virtual world is as real as the in-person world.

The group clearly wanted to continue the discussion on defining the given crisis more, but to save time the moderator suggested that they could try to find the additional crisis from the presentation that Jerome Glenn gave, with particular mention to cybercrimes, which was also touched on earlier by the group. After a short discussion, the group agreed to choose **"organized cybercrimes"** as an additional crisis. This was backed up with the notion that nowadays there are more space and possibilities for cyber criminals, and people are still being quite naïve and innocent towards what could happen. The group were all in favour of the chosen polycrisis.

Figure 21. Participants working together (Group 3). (Photo: Tolga Karayel)

Phase 2 – choosing elements to help cope with the polycrisis:

Thediscussion was then directed towards choosing elements that would help with coping the polycrisis, and thereby, assist in finding solutions to the polycrisis. The first thought related to the element of **nature**, by getting off the grid, and **going back to nature**, effectively escaping the cage of social media. Another thought was using **personalized self-medication, or drugs**, to have a break or escape from the digital life – or alternatively 'have a trip' in virtual reality, as a way of escape[32]. One participant mentioned that, in a conference called South by Southwest (SXSW), 25 percent of the topics dealt with psychedelics and how to utilize them in current world, so the idea seems very topical. The thought was offered that it might just be escapism, too. This sparked another threat, namely the **brain computer interface**, which offers the possibility to invade someone's brain and stealing their thoughts.

Phase 3 – finding possible solutions for successful societies:

The first solution that the group started discussing was a surprising, perhaps even controversial, idea taken from Jerome Glenn's presentation, namely **inviting the cyber criminals to the same table** as representatives of their tribes. The need of **global governance** was pointed out because the criminals are not bounded to physical spaces and therefore nations, so it is important to deal the issue on a global level rather than the level of nation states. The concern was raised that the cyber criminals would not follow guidelines anyway, with the implication of them 'getting the best of both worlds', in regulated as well as non-regulated environments.

Especially with social media and younger people, **education is ever important**. The group thought that it is important to **educate children about AI and cyber security**, with topics on how to create strong, unhackable passwords, and so forth. Teaching them these skills would be best when they are younger, not older. One member mentioned it as teaching "**complexity skills**", the ability to differentiate relevant information from all the available information and how to create critical thinking in this dramatically changed world.

The importance of education was also highlighted when looking for solutions from the possibilities that nature offers. One participant mentioned the concept of **"planetary living skills"**, mentioning the importance of being connected with nature, even when we are living in virtual worlds. The moment we lose our connection to nature, we are driven too deep into virtual and social media space, thereby losing the healing power of nature. One solution presented was to be **more aware of both our physical and our virtual presence**, so that one could be able to find the balance between them. The thought was raised that we need **basic living skills, such as self-efficiency and self-reliance**, especially during decentralisation phases of the polycrisis.

The group distributed the solutions they came up with to the timeline of 30 years. All the ideas were first allocated to the first 10-year slot (2033). Following a short discussion, the group then managed to distribute some of the solutions to longer time periods.

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[32] Virtual reality escapism, as escapism in general, might be however double-edged sword. In review article by Ljubisa Bojic (2022) it is noted that we should also consider possibility of metaverse addiction. A question is posed: "… what if these virtual worlds are so much better than reality, so people do not want to come back?". (Bojic 2022, 13.)

Lastly, the moderator raised the role of the public space, and asked whether **public space could operate as a bridge** between the isolating effect of digital social media and the physical public space. This discussion sparked the concept of **digital twins and digital twinning**, and the need for a digital public sphere. As the cyber criminal leaders will not be in a physical space, that space needs to be digital. The discussion at the table ended in talking about the positive sides of social media, how it connects and engages people from all over the world. In actual effect, **social media itself can be defined as a public space,** because it is available for all, and everyone can participate.

Phase 4 – naming the approach:

Post-its were used by the group members, whilst other groups were presenting, to share ideas on a possible name for naming the group's approach. The moderator's suggestion, "global cyber police", was softened to be "global cyber policies". After careful deliberation, the final names were agreed on, namely **"back to tribal"** or **"decentralized intelligence and communities"**.

When finalizing the digital sheet, the name for the approach was "Back to tribal" while "decentralized intelligence and communities" was moved to the solutions part.

Feedback and remarks

Sirkka Heinonen noted the relevance of the idea of global cyber policies and drew attention to the notion of going back to tribal communities, with tribal leaders. She posed the question whether new leadership skills developed in the future could and would also include tribal skills. How to lead a tribe might be useful skills to acquire in the future. She also stressed that there is and remains strength in the old systems – although we have forgotten them, they are not old-fashioned, and there is strength and wisdom in the old practices. We would do well to revisit these practices for futures-resilience. So, the concept of tribe is to be rethought and revised into the modern context.

Although no one made specific mention to it, the element of "self-medication with psychedelics" was considered a quite radical solution to the mental health problems, as it did not spark more conversation. Obviously, such self-medication with psychedelics entails various ethical and legal issues as well.

Table 3. *Roadmapping results of Group 3.*
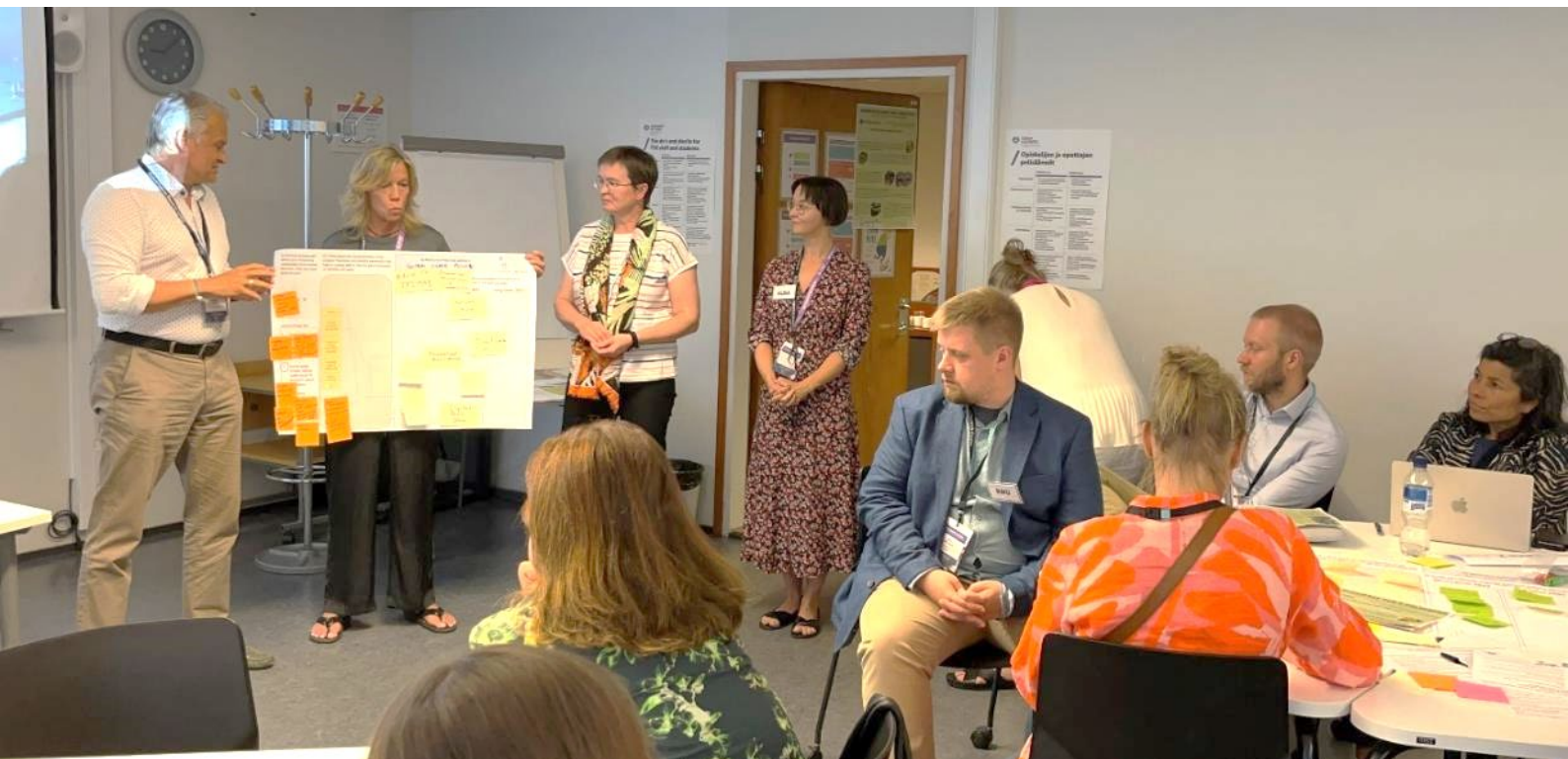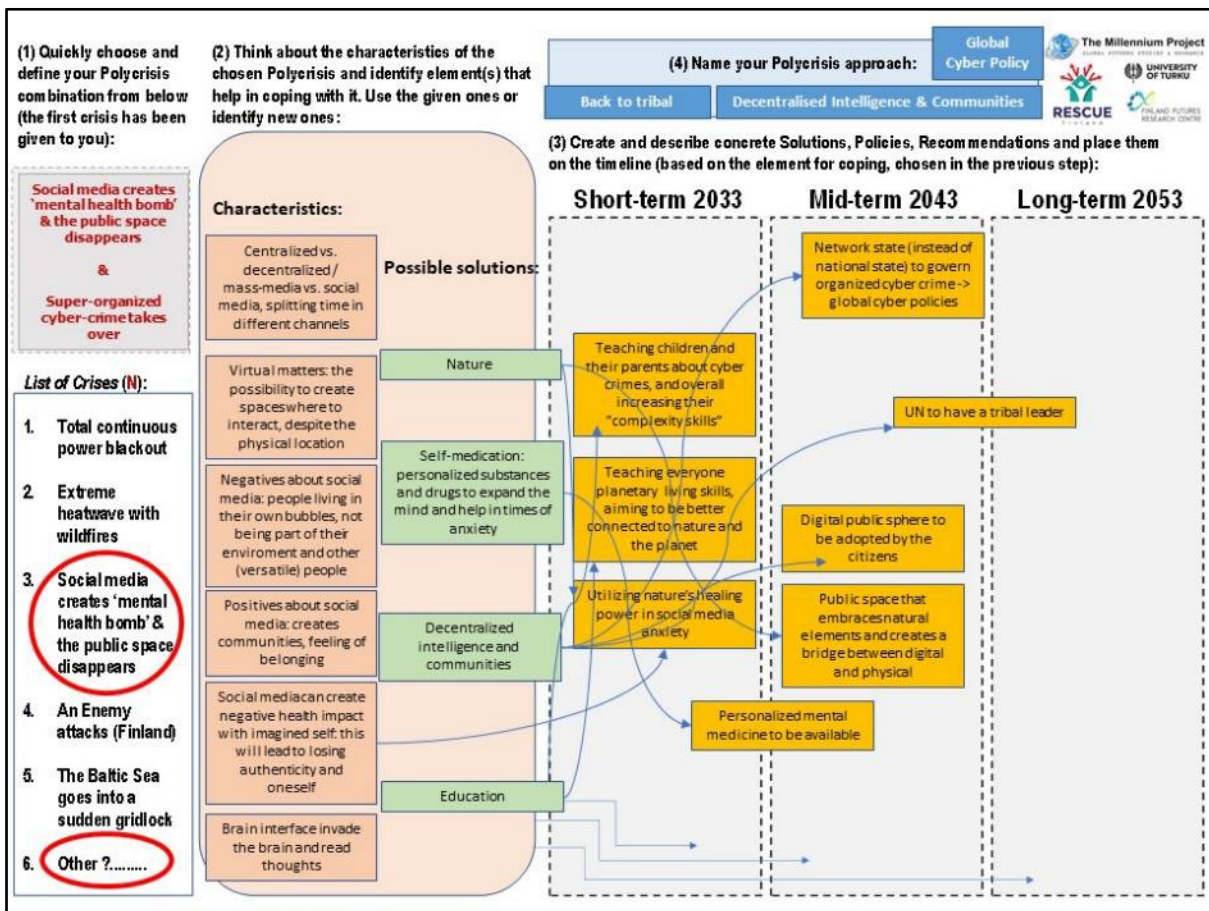
Figure 22. *Participants presenting their results (Group 3). (Photo: Tolga Karayel)*

Group 4 – Polycrisis of "An enemy attacks", "Power blackout" and "Social Media 'health bomb'"

Moderator: Lassi Tähtinen, Aalto University

Phase 1 – introducing the topic and defining the polycrisis:

Thecrisis allocated to this group was **"An enemy attacks Finland"**. At the start of the session, the moderator allowed time for the group to introduce themselves and, at the same time, to save time, suggest a second crisis to form the polycrisis.

The participants in the group offered various suggestions, with most participants choosing alternative crises to the ones mentioned before. The participants intuitively thought about logical combinations when considering creating the polycrisis, and the moderator reminded them that it is possible (and encouraged) to be creative and not be too logical in creating the polycrisis.[33] In the end, the group decided to take on a challenge and agreed to add two crises to the given crisis, namely **"Total continuous power blackout"** as well as **"Social media creates a 'mental health bomb' and the public space disappears"**.

The group was excited about the topic and the three crises chosen and started to discuss the polycrisis almost immediately. The moderator encouraged the group to first start thinking about what the implications would be for each of the crises, should they occur.

One participant suggested that they could see the polycrisis unfold in phases, namely first **"An enemy attacks Finland",** then **"Total continuous power blackout"**, thereafter **"Social media creates a 'mental health bomb' and the public space disappears"**.

Another participant offered an alternative order to the events of the polycrisis unfolding. This sparked debate about **causalities between the different crises within the polycrisis**, more specifically about whether it all happens at the same time or whether it happens in phases, one after the other, overlapping. If in phases, the question to consider would be in which order it might unfold. One participant also made the suggestion that one crisis could be the solution for a second crisis, e.g., the total power blackout could be helpful in dealing with **"Social media creates a 'mental health bomb' and the public space disappears"**. The social media crisis was deemed a bit of a "different" crisis. It was slightly difficult to position, but the conclusion was that it is more as a creeping crisis and was looming already before the attack and blackout, and perhaps escalated afterwards.

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[33] Naturally, in real life you cannot choose the components to a polycrisis but once hypothetically chosen you can probe the situation and rehearse it.

Figure 23. *Participants working together (Group 4). (Photo: Tolga Karayel)*

Phase 2 – choosing elements to help cope with the polycrisis:

The group circled back to the coping elements that were introduced briefly earlier, which created good discussion. **Going analog** to help deal with the power blackout came up strongly.[34] Elements were offered by participants, and conversations around these elements resumed. The final decision of the group identified **citizen's emergency supply skills** as the best coping element for this polycrisis, as it felt most comprehensive and all-encompassing. The group decided to pick another element if there was time left after the first round.

Phase 3 – finding possible solutions for successful societies:

The next phase required the participants to consider the polycrisis and the element of **citizen's emergency supply skills.** The question was asked how these emergency supply skills could be utilised in the short-, mid- and long-term to help citizens cope with the polycrisis. The group was encouraged not to feel limited by providing chronological solutions, but that they are free to suggest long-term solutions before short-term solutions, if it comes to mind first.

One participant mentioned the potential and likely **discrepancy that would exist between rural (countryside) and urban (city) environments** (capacities, tools, resources) in dealing with the polycrisis. Therefore, the population in cities would likely be disadvantaged in the short-term if the polycrisis happens as a surprise. Focus was directed somewhat on **institutionalisation of educating individuals with the emergency supply skills**. This included more short-term actions such as organizing **practical courses**, and **long-term strategies** (an action plan) to integrate these courses into the education system. **Rehearsing the retrieval of the equipment and the general polycrisis**, **coordination and oversight** (perhaps

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[34] Going analog could also be an intentionally used approach to address a false digital utopia as Sax (2022) claims.

by a central institution or coordination committee), **technological alternatives** (in case of electricity black-out), and **spatial distribution of related equipment and means**, such as mobile news distribution units, were also discussed.

With time running out, the mental health bomb crisis did not get significant attention, but a central thought was the idea that the primary crisis of **"An enemy attacks Finland"** could be used as a shared threat to unify the population and lift the spirits, **using a crisis as an opportunity** to mitigate some of the effects of the original crisis. The **risk for ultranationalist propaganda** remains a concern, however. The final realization of the group was that **diplomacy** is a key element here, with **trust and confidence that would need to be rebuilt** in the long-term. **Communication alternatives**, and varying communication channels for the flow of information, especially trust-worthy news, would need to be considered and implemented in the long-term, to deal with numerous effects of the polycrisis.

Phase 4 – naming the approach:

These discussions led to the last phase, the naming of the approach. Two suggestions were made by way of Post-its during other groups' presentations, namely **"Decentralised learning approach"** and **"Individual resilience-building for the collective"**. Lastly, one participant also mentioned that the group might have overlooked providing mutual assistance to all citizens in the short- to mid-term, as everyone would not have the same amounts of everything needed to deal with the polycrisis. During the presentations of other groups, the issue of **diplomacy and international relations** were also raised by some group members as part of short- to long-term solutions.

Feedback and remarks

Sirkka Heinonen described it to be noteworthy that this group raised the level of ambition by choosing three crises to tackle a polycrisis. The more crises there are piling up on each other, the more complex the situation gets to cope with. She applauded that the group reflected on the temporal order, as well as on the interconnected causality of the crises happening in the polycrisis. The situation may be different depending on the order in which the crises occur. Accordingly, temporality matters. If the three crises were to happen simultaneously it is also different from the cascading model of the polycrisis (i.e., one crisis after another in a short period of time).

Furthermore, it is a paradoxical positive angle that one crisis might provide a solution to cope with another crisis. This approach also merits further scrutiny. As in other groups, the role of education was highlighted. This group emphasised the potential of the individual's skills for the good of the whole community.

Education was also linked with communication – and here especially new alternative ways of communication were called for. This is important, because in times of crises swift, clear and fact-based communication is needed. 'Going analog' was identified as one of the elements for coping in a crisis. Perhaps in future war/attacks, animals will be used for communication cf. pigeons in WWI.[35]

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[35] Pigeons were used successfully in aircraft and ships. However, they were most commonly used by the British Expeditionary Force to send messages from the frontline trenches or advancing units.

Table 4. *Roadmapping results of Group 4.*
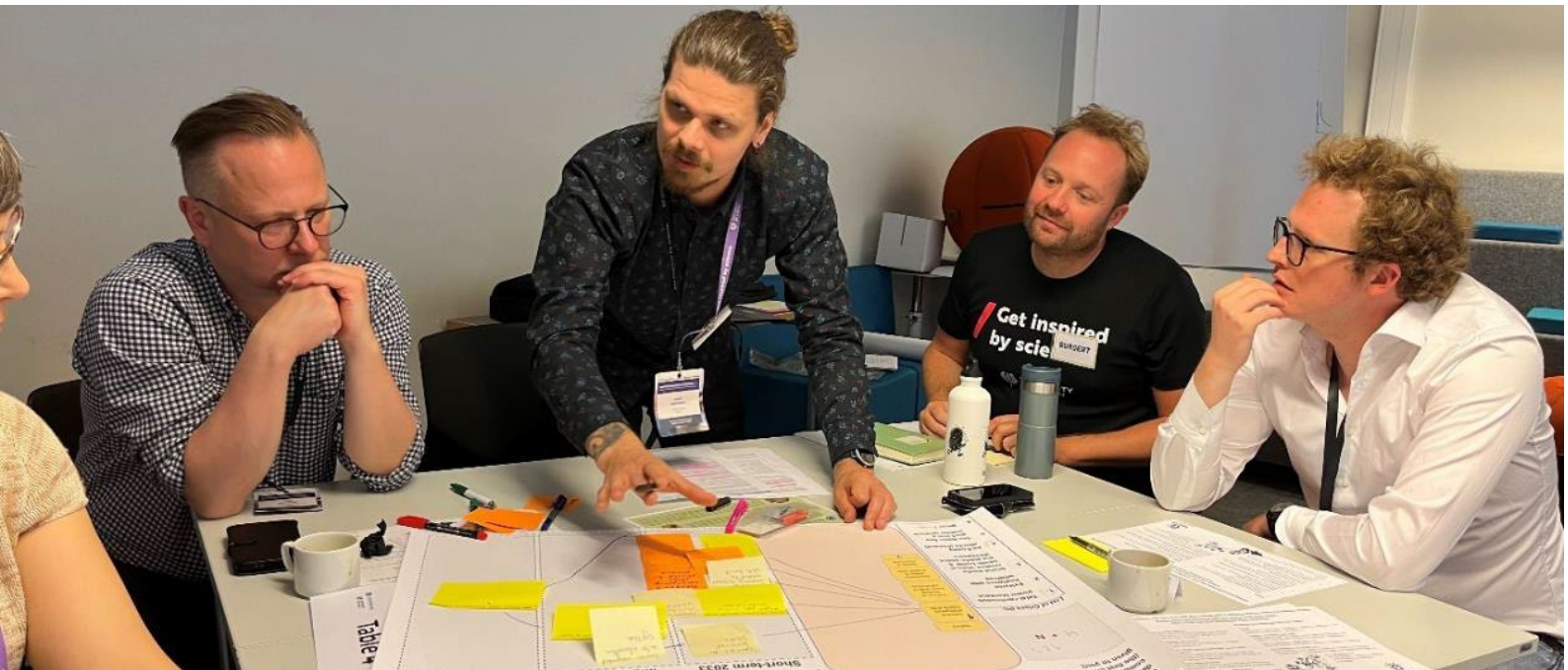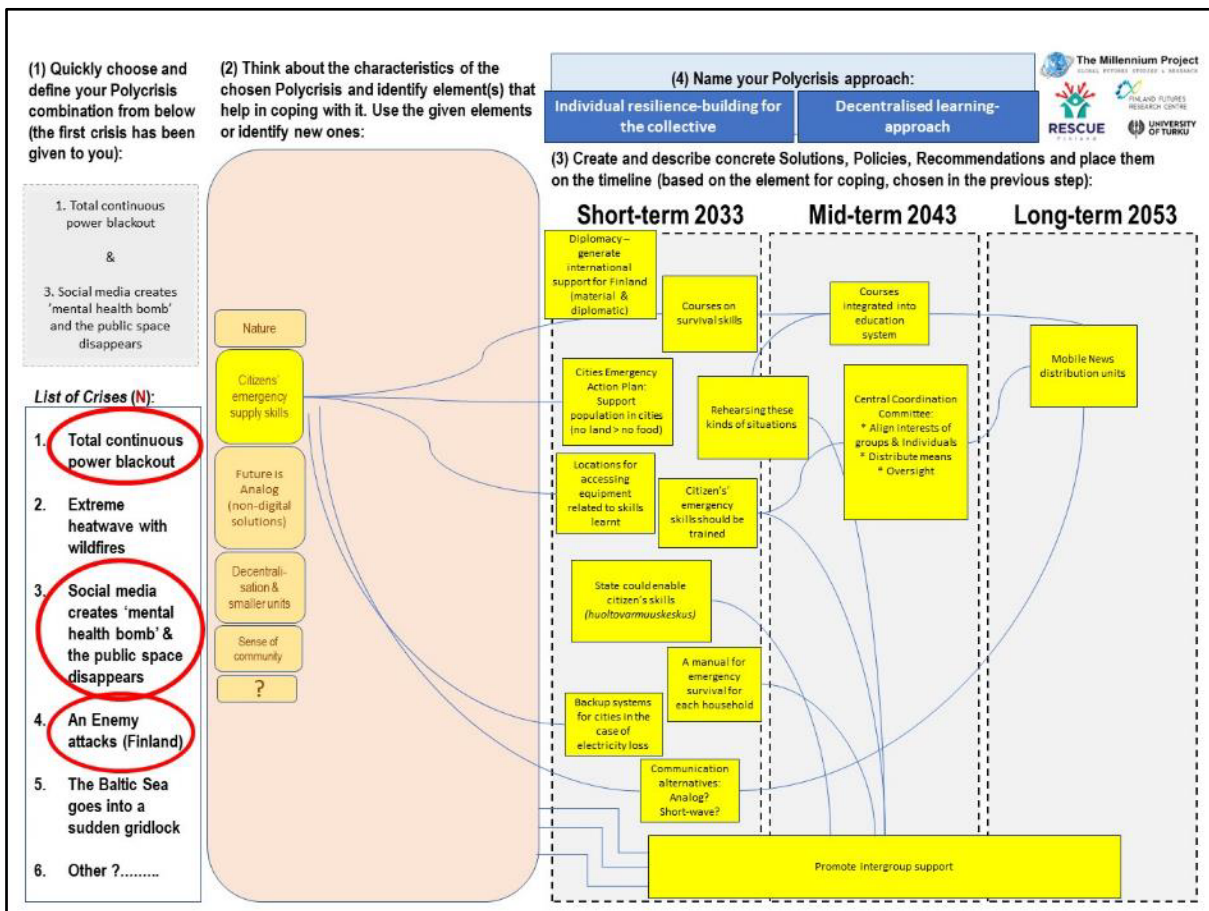
Figure 24. *Participants working together (Group 4). (Photo: Tolga Karayel)*

Group 5 – Polycrisis of "Baltic Sea gridlock" and "Quality of Water"

Moderator: Saija Toivonen, Aalto University

Phase 1 – introducing the topic and defining the polycrisis:

The moderator asked the participants to introduce themselves and suggest their preferred second crisis to add to the given crisis, namely **"The Baltic Sea goes into a sudden gridlock"**, to form a polycrisis. The participants all had different suggestions, referring to the given options of crises to choose from. The group decided and agreed that their own chosen crisis, **"The quality of water"** would be a suitable second crisis to the form a polycrisis with. It is important to note that their chosen crisis, although referred to by the group as "The quality of water", and referred to as such in this report, is meant and defined as **"The deterioration of water quality".[36]**.

The group effectively considered and chose a second crisis first, then revisited the first crisis, namely **"The Baltic Sea goes into a sudden gridlock"**, to better understand what was meant by the given crisis. This might have happened because it was assumed that all participants around the table knew what the given crisis was about and implied.

Discussion was had on how the gridlock could happen. It could occur for many reasons, for example due to an accident, such as shipping lines crossing paths, Russian nuclear submarines, poisoning of the Baltic Sea, etc. From the discussions, a reminder was provided by one of the participants that the gridlock happens suddenly, not over time. The isuue of the quality of water, as accepted by the group, would be related to both the Baltic Sea and the lakes surrounding the Baltic Sea.[37]

Phase 2 – choosing elements to help cope with the polycrisis:

The moderator discussed the different elements that were given as options to help cope with the polycrisis, then encouraged the group to choose an element that would help them deal with their specific polycrisis. As happened in other groups too, one participant suggested that the group discuss further the characteristics of the polycrisis first, before choosing an element to help cope with the crisis.

The group reasoned that, during the chosen polycrisis, the quality of the water would radically deteriorate. Combined with the depletion of oxygen, contamination would most likely occur. If ways to clean the sea could be imagined, it could allow a way to deal with the gridlock. The elements of **nature** and **technology** were the predominant elements that the group decided to use to deal with the polycrisis.

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[36] Naturally, quality of water is the topic and a crisis is at hand when the quality of water gets deteriorated.
[37] The topic of next year's FFRC Conference is related to the issue of water: 'Regeneration of natural resources'.

Figure 25. Participants working together (Group 5). (Photo: Tolga Karayel)

Phase 3 – finding possible solutions for successful societies:

Extracting and using the algae, rather than wholly remove it, could be part of the solution. New algae could also develop in these new conditions, although the effect could be either positive or negative. **Algae bloom harvests**, even synthetically, could be utilised as a short-term solution. There are already ways to make protein algae. **Geo-engineering** ideas to exercise some measure of control, as a technological solution, include building a dam wall in Denmark to block off the Baltic Sea to mitigate the climate change and subsequent sea level rise (SLR). The effect it would have on other countries should, however, also be considered.

Ownership of the sea area could necessitate legislation around it. Questions were raised on how to make use of these potential opportunities, but a lack of physical access to the Baltic Sea might hinder these opportunities.

Integrating satellite observation in the Baltic Sea would help in monitoring any given crisis, especially a polycrisis. Proactiveness, in the sense of observation, but also in general, would help with mitigating the effects of a crisis in the Baltic Sea.

It appeared productively that more questions arose when the group was formulating solutions. The **"quality of water"** was also not discussed in depth. One participant mentioned that the Baltic Sea is suffering because of the **nitrates from the fertilisers**. A combination of the warm weather and nitrates from the fertilisers create blooming algae, which **could become toxic in the future**.

Gridlock would also cause **problems in transportation**, with workers from Estonia, for example, not being able to travel. Would they then have to fly? It would last for longer, not just a nuisance for one day, which would problematise the transport grid in the Baltic Sea.

One participant asked about how the issues with **transporting freight** could be addressed. A hyperloop is already under discussion to have been developed by 2050. One participant also mentioned walking to Tallinn. It was asked whether there would be a way and/or purpose to bring the toxic materials to land and do something then with it. Another participant wondered whether it would be possible **to increase waterflow to some parts of the sea** to keep it usable.

Discussions largely dealt with water purification and enabling high-speed traffic and , with some other possible effects and solutions noted but not delved deeper in. During the discussions in this phase, participants also tended to come up with familiar solutions to specific cause and effects within the polycrisis, rather than attempting to gain a holistic understanding and approach to the polycrisis, and thereafter forming comprehensive solutions that would deal with most or all of the cause and effects within the polycrisis.

Phase 4 – naming the approach:

One participant asked whether the approach is to mainly fix the problem(s) that has been created by the polycrisis. Suggestions for the approach varied from **"Aqua Futura Baltica"** and "From a Baltic Pea Soup to (a solution)" to "Rescuing Baltic Sea".

It was mentioned in discussion that the group was able to solve for the gridlock but the water quality was not addressed significantly. It was suggested that a dam, combined with an algae plant - becoming a vertical algae plant- could help in purifying the Baltic Sea.

The approach, **"Aqua Futura Baltic"** was accepted by the group as a representative approach. Food developed from the algae, termed "Scandi Algae Food Mania" could be one mid-term to long-term solution to the polycrisis.

Feedback and remarks

In Sirkka Heinonen's observation it is important to notice that the crisis of the Baltic Sea gridlock could happen due to a number of reasons. Accordingly, responses and solutions are naturally varied but the result of the gridlock focused on water. That is a crucial element to life and health of humans, but also affecting various activities happening at sea.[38] It is an appropriate example showing that **nature and crises do not know national borders** but affect all involved.

The discussion dealt with Tallin, so the potential of twin city development and connections of Helsinki and Tallin could be addressed more. As this group chose for their second crisis in the polycrisis to be deterioration of water quality, they immediately addressed two wide complexities – nature and technology. This in combination means that solutions for crises can be found from nature – via biomimicry – even ending up having innovations, such as various new food products from algae. This group also projected discussion towards space. Satellite observation can provide real time data on state-of-the-art of the sea water quality but also on the actors affecting it.

The ease with which participants are able to come up with solutions for the near future is clear, but they somewhat struggle with solutions for the distant future. This stance has been evident in most groups and confirms how difficult it can be, for humans, to consider longer term visions and rather believe the extrapolation of the 'now', the business-as-usual, to reign.

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[38] See also a report by the National Transportation Agency where the possibility of Baltic Sea Gridlock was thought of (Metsäranta & Heinonen 2023). https://www.doria.fi/bitstream/handle/10024/187506/vj_2023-44_978-952-405-083-8.pdf?sequence=1

Table 5. *Roadmapping results of Group 5.*
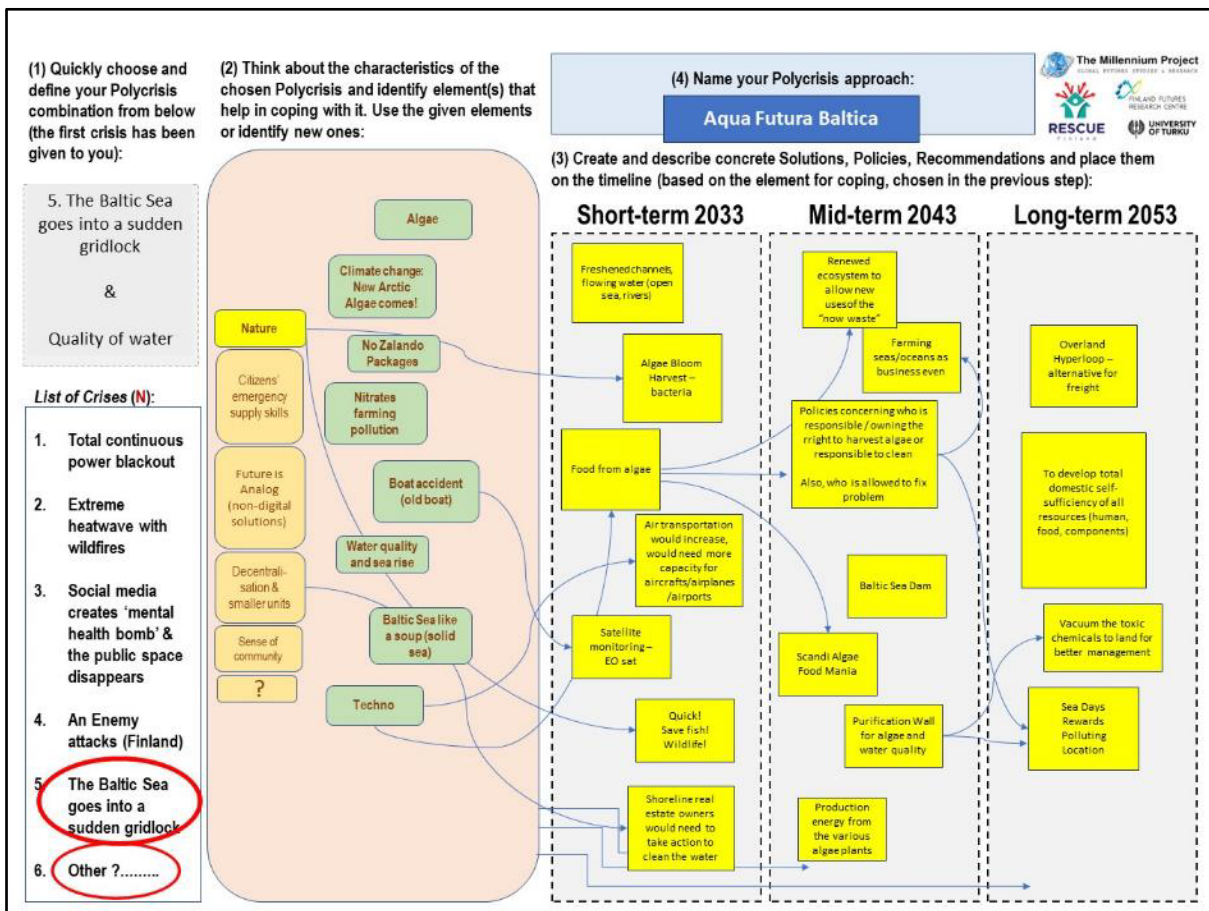
Figure 26. *Participants working together (Group 5). (Photo: Tolga Karayel)*

4.   CONCLUDING REMARKS

This report comprises a detailed account of two interactive Millennium Project Sessions conducted during Finland Futures Research Centre (FFRC) conferences in Turku in the years 2022 and 2023. Both sessions included keynotes and joint discussions together with moderated small group work. The joint overall goal was to tackle global challenges in making cities crisis-resilient and flourishing, even in polycrises.

Even though the futures cliniques introduced in this report had different emphases i.e. the first session on AI and the second one on polycrises, they shared a common theme which is building green, digital and resilient urban space. This topic featured essential in another report, too, documenting the work of another futures clinique conducted at Europe Hall in Helsinki (Heinonen et al. 2023c)[39]. There is a strong link between that clinique and the one that was held at the FFRC conference in 2023. This is because the crises that participants were asked to ponder were originally the same. The dynamics of the foresight process was designed so that while in the Europe Hall Clinique the participants had to deal with only a singular crisis, the second FFRC conference Clinique (2023) combined various crises and created polycrises to elaborate on. Furthermore, FFRC conference clinique's overall themes for solutions were the same as were introduced during the Europe Hall clinique.

It is very evident that there are equal measures of excitement and concern surrounding the development of AI (see e.g. Suleyman 2023). The measure to which urban spaces, in particular cities, will be resilient to crisis, will in part depend on the successful adoption, with caution, of AI in policies and crisis response strategies. It is expected that AI will be very efficient in detecting early warning signs of impending crisis and could help alleviate the burden of dealing with a crisis once it happens. In addition, cities are encouraged to have policies in place to own their data, their processes as well as evolutions of their projects. The connecting ability of AI (connecting people, processes, solutions, etc) would play an important role in building resilience during times of crises. The opportunity to co-create measures of resilience in urban spaces might be one of AI's most useful applications. However, it should also be noted that one group pondered possibility of low-tech solutions, which could in their own right increase citizen's well-being (Sax 2022). This kind of thinking is interesting because in some of the groups in the above-mentioned Europe Hall clinique participants also offered this kind of point of view as a solution for crises. The idea was that urban environment should be more analogue or there should be analogue backup systems because it would reduce vulnerabilities during the time of crisis. (Heinonen et al. 2023c.)

It is important to remember one of the definitions offered earlier in this report for a resilient city. A resilient city can be defined in many ways: one of the ways is that a resilient city is the capacity of cities to function, so that the people living and working in cities, especially the poor and the vulnerable, can survive and thrive with whatever stresses shocks and crises that are happening. AI would be very useful in this process, but should be considered critically, to ensure that the poor and vulnerable, as well as non-human, are considered equally to the rest of society.

Polycrises, two or more crises occurring at the same time, are also expected to become more evident in the complex and integrated world we live in. Overcoming polycrises is dependent on designing and building resilient, sustainable, just, and liveable urban areas. Key in this, as highlighted by various groups in the 2023 Special Session, is the concept of decentralization, so as to simultaneously manage the impact

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[39] Published in Finnish.

of a polycrisis better and allow a more rapid and effective response to the polycrisis, in whichever way it might present itself[40]. Communication, survival, and the reorganisation of community would be key in the aftermath of a polycrisis, and these elements must be proactively considered and built into a plan of response before a polycrisis occurs. These elements aim to and would inevitably increase individual and community agency, which is important in managing a polycrisis.

Even though the timetable was challenging, some groups were able to generate polyopportunities and polysolutions. For example, the second group thought that courses that teach emergency supply skills to citizens, could also include communication education which would then strengthen the sense of community. Furthermore, the group claimed that planned mobilization of citizens would also affect positively the sense of community because people would be helping one another including the most vulnerable groups. This way crisis can offer a change to deal with already existing challenges. For example, building a sense of community could help people to deal with digital isolation that they are feeling nowadays[41]. The fourth group also saw a possibility of polyopportunity in their crises. They argued that one of their crisis (mental health bomb) could be partially solved by another crisis (enemy attacks Finland) because this kind of threat could lead to the unification of people and even lift the spirits as common enemy threats the whole population and country. It should be, however, noted that this solution could also sow a seed of a new problem in the form of ultranationalist propaganda. Last example of polyopportunities came from the fifth group. The group chose the Baltic sea gridlock and (deteriorated) quality of water as their polycrisis. Considering this, they suggested the possibility of extracting and utilizing algae in the sea. This could include harvesting algae bloom and it was noted that algae could be already used to produce protein.

Table 6. A matrix of polycrises and the themes of their suggested solutions and opportunities.

Element / Polycrises	Nature	Citizen's emergency supply skills	Future is Analog	Decentralisation & smaller units	Sense of community	Education	Self-medication	Technology
Total continuous power blackout + Social media "health bomb"		X		X				
Extreme heatwaves with wildfires + Total continuous power blackout		X			X			
Social media creates 'mental health bomb' & public space disappears + Organised Cyber Crimes	X			X		X	X	
An Enemy attacks (Finland) + Power Blackout + Social media "health bomb"		X	X					
The Baltic Sea goes into a sudden gridlock + Quality of Water	X							X

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[40] One of the topics recognized during World Future Day session 2022 was Eco-smart cities. During these discussions, interesting counter-trend was notified. Even though larger cities and more population living in these cities is somewhat megatrend, opposite development is also possible. It may be that technology and possible new pandemics lead to a situation where people actually move away from the cities to smaller communities that are self-sustaining. Therefore, cities become somewhat a tourist attractions where people go spend their money and utilize different services but they actually live somewhere else. (Di Berardo et al. 2023, 9.)

[41] Digital isolation is one of the creeping crises recognised in Towards Twin Transformations and Spaces – Convoluted Conversations on the Green and Digital Futures of Work report where interviewees where asked to name creeping crises as a part of the interviews. (Heinonen et al. 2023b.)

The above table illustrates that while the crises are complex issue as such, the solution needed also tend to require a multifaceted approach. Every group chose more than one element to govern their polycrisis. Furthermore, citizen's emergency supply skills profile very high in many groups so it can be argued that participants saw skills of individuals' as a vital part of resilience building. Building resilience this way would also probably lead to stronger resilience of communities.

This is, however, a double-edged sword. On the one hand, the idea of citizens' skill building is preferable because then people can have stronger agency during the time of crises and not be just passive bystanders. They are not also so dependent on outside help. On the other hand, this leads to a question what the role and responsibilities of the state or city is in the time crises. Are people the one who are expected in the end to be responsible for the resilience building and crisis management or could government help more actively with this resilience building? Besides emergency supply skill courses, what else government could do? There is danger that this kind of thinking leads us to demand too much from the citizens and too little from the government.

Resilience building and crisis management should be all encompassing so the public sector[42] should not be forgotten even though it is clear that citizens have a vital role to play in this endeavour. Another thing that was not discussed so much in the groups was how legislation and legislative framework would adapt to the resilience building and crisis management. For example in European Union there has been call for "Future proof policies" (Fernandes & Heflich, 2021). This entails that policies should be more crises resilient and take account events that are more surprising. For example, there has been a study where EU-policies are stress-tested, which basically means that legislation's preparedness for crises is being assessed in the face of crises (Fernandes & Heflich, 2022). Maybe as a further study, we should consider how crises management and resilience building efforts that the groups suggested could manage new possible crises. Furthermore, it should also be considered are what kind of challenges these new policy initiatives may face in the existing legislative framework. The nature in the development of AI is still unsure, although regulation is strongly advocated. The nature in the development of AI is still unsure, although regulation is strongly advocated. AI, if effectively used and harnessed, can be a very useful tool in both anticipating polycrises and assisting in the management of them more effectively.

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[42] For the role of government in crisis management, check for example Pot, Scherpenisse & Hart (2023) who study how Netherlands has applied "temporal strategies" to counter effects of dual crisis (flooding and climate change).

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Appendix 1

Participants in the small groups in MP 2023 Special Session

Group 1

Kati Lehtiö – moderator (Master's Student in Futures Studies, Turku University)
Francisco J Janego
Nikita Uverov
Osmo Kuusi
Rosa Alegria

Group 2

Viivi Koivuniemi – moderator (Master's Student in Futures Studies, Turku University)
Laila Mendy
Ana Jones-Wilenius
Mikko Dufva
Merja Lang
Osku Haapasaari
Riku Viitamäki

Group 3

Elisa Oinonen – moderator (Master's Student in Futures Studies, Turku University)
Elizabeth Strickler
Tiina Jokela
Markku Wilenius

Group 4

Lassi Tähtinen – moderator (Doctoral Researcher and Project Coordinator, Aalto University)
Toni Ahlqvist
Marianna Birmoser Ferreira-Aulu (part of the time)
Samuel Cipers
Minna Halonen
Burgert Maree

Group 5

Saija Toivonen – moderator (Assistant Professor – Real Estate Economics, Aalto University)
Leena-Maija Laurén
Siyoda S. Witoon
Amos Taylor
Risto Sivonen

The RESCUE Project narrative for MP Special Session 2023 was printed out and put on the walls of the venue, as well as given to participants as hand-outs. It served as inspiration for the session.

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