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EDA Technology Foresight Exercise 2021 Welcome to The Futures

Future Narratives





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Contents

| About this document | . 3 |
|---|-----|
| TechUtopia | . 5 |
| Business as usual? | . 8 |
| Darwinian Games1 | 11 |
| Humanity vs. The Hungry Beast1 | 14 |
| Additional Futures summarized per dimension1 | 16 |
| No free will (Major breakthrough on quantum, change of world power) | 16 |
| A world without touch (Pandemic world)1 | 8 |
| Future Corp. – New world order (Artificial intelligence understood by humans as God)2 | 20 |
| LongCovid's long arm2 | 22 |



About this document

The Futures Tellers, the core team of multidisciplinary experts of the EDA Technology Foresight Exercise 2021, designed alternative futures for 2040+, which are presented in this document as "Futures Narratives". The Futures Tellers proposed this set of disruptive futures, looking up to 20–30 years ahead into the future, providing the framework for the Foresight Exercise. The objective of these futures narratives was to inspire and spark the imagination of the experts participating in the Exercise, not precluding nor pre-empting the discussions, but highlighting some possible future options (from very disruptive to more linear ones).

To create these futures, each of the Futures Tellers shared their ideas in their areas of expertise, coming together as the pieces of a puzzle. Each of these puzzles conformed 8 different alternative futures, 4 of them selected and further developed as the main futures narratives presented in this document. The ideas conforming the other four futures are summarized in the annex.

The futures, presented with no special order, were designed along the following dimensions: Defence; Economic; Environmental; Ethical; Geopolitical; Health / Human; Social; Technology. The dimensions of the four main futures are presented facilitating the narrative, not always following the same sequence. These dimensions, and the key ideas (focus topics) around them, were the starting point for the discussions of the first event of the Exercise.

About the Futures Tellers, they are forward looking experts from different countries, with different backgrounds, defence/military and civilian, and from different generations. They cover domains as sociology, environment/climate change, biotechnology/medicine, economy, science fiction, design/arts, foresight/futurists, history, industry, philosophy, ethics, operations and technologies. This group has been carefully constructed to foster cross-fertilization of ideas and increase creativity, also supporting the different phases of the EDA Technology Foresight Exercise 2021.



TechUtopia





TechUtopia

Some cheeky, savvy kid asked his physics teacher: "but what came first, effective nuclear fusion or operative quantum computing?" It did not matter anymore, it was what we were all hoping for. After years and years of waiting, controlled nuclear fusion was finally on, and dozens of small stellarator reactors were happily fusing plasma all around the World. And as for quantum computing, surprise! It arrived earlier than expected. Thinking about it, it all makes sense now: the new-born quantum computing was used to improve quantum computing and then to design fusion systems. As usual, past events seem to happen logically.

No matter how we look at it, the advent of fusion and quantum computing were providential. Back then, bizarre heatwaves set Siberia on fire, freakish snowstorms were devastating crops in southern Europe, and land, property and hopes were lost to the rising seas. Although the world's nations had finally realized that they had to work together against global warming, renewable energies were not enough. More daring approaches were required.

And they were taken, indeed: large investments were put into research to capture the energy from lightning by means of drones equipped with ultracapacitors, and space missions were launched to start testing energy capture from the solar wind using the Dyson-sphere concept. Then, when no one was expecting it, Wendelstein 7-X achieved steady fusion, and everything really started fitting into place. A few years later, nuclear fusion was replacing other energy sources. In parallel, high density energy carriers along with a hydrogen infrastructure were developed to store and distribute the energy surplus.

As for the quantum revolution, it had an almost immediate impact in biomedicine thanks to the capacity of quantum computing based AI to model and effectively predict highly complex systems, something unthinkable with classical computers. With such power in their hands, bioinformaticians developed algorithms capable of designing personal and optimized treatments and drug synthesis routes to heal all known medical conditions. These great achievements, plus the development of gene editing and automated medicine, contributed to alleviate a great deal of the suffering associated with the human condition.

Changes also transformed the transport sector. Fully autonomous cars and unmanned flight traffic became a reality thanks to the deep control and real time optimization that quantum computing enabled. Thanks to hypersonic flight, travel times were reduced exponentially but people did not need to travel physically because holographic technology coupled with virtual and augmented reality allowed a fully immersive travel experience from any place in the world.

The World finally came together to make the Sustainable Development Goals (SDGs) a key priority, and it achieved the 17 SDGs providing peace and prosperity for everybody on the planet. In a bold move toward achieving equality, centralized Al-based algorithms were implemented. They were conceived to ensure the most efficient resource allocations to individuals based on predictions and dynamic updates through emotional, semantic and sensorial perception interfaces. In most nation states, traditional political systems were replaced by Al-based governance systems with no possibility for corruption. Elections were still held, but these were no longer about individuals or political parties but about algorithms representing different political mind-sets.

Moreover, automation and robots replaced millions of jobs worldwide, which revolutionized the concept of work and income. Societies evolved toward enabling a greater interest for creative



activities, culture, nature and sports. Aided by AI, this was extended into the realm of thought, and the 1st Mental Olympics were held in 2040. It was natural that new religions began to evolve, when an AI-guru fostered the development of algorithms aimed to increase health and well-being. A core tenet of this religion posited that humanity can only experience true happiness outside the solar system. Strangely, and despite it being regarded with suspicion by most established religions, funding always seemed to be available to develop the necessary technologies to send humans beyond the solar system.

However, dissident humanist groups proliferated all around the world to demand the abolition of algorithmic governance, arguing a lack of transparency in the AI models and the inability of machines to take legal responsibility for their decisions. The number of subversive forces aiming to bring back the old-world order of human decision makers began to increase. Their attacks, ironically assisted by AI increased the need to protect critical infrastructures, as our dependence on technology grew. Fortunately, AI-enhanced weaponry enabled benign powers to gain a decisive advantage, and they were able to quickly subdue aggressors who violated the UN Charter rules. These led to the development of new military doctrines and tactics, also thanks to the new capabilities enabled by the availability of almost unlimited and flexible energy. In particular, the use of high-energy laser weapons provided a strong operational differentiator to the most advanced technological countries, including Europe.

As the capacity of the EU to produce its own energy increased, the political influence of Russia on its neighbours waned accordingly. Anticipating its own decline, Russia increased its military pressure on its neighbouring states. Also hit by the decreasing demand for fossil fuels, oil-rich nations of the Middle East went through a period of instability resulting from the transition toward the adoption of new economic and societal models, the first less dependent on natural resources and the second less constrained by religious views.

Concomitantly, the African continent stabilised geopolitically thanks to a better balance in its relations with Europe. Russian and Chinese military and economic influences were moderated through a joint, coordinated action by the African Union. Africa entered a period of rapid economic growth and democratic progress and became a key provider of raw materials to Europe. In return, Europe became Africa's major supplier of energy while supporting the continent with the provision of technology, primarily in energy infrastructure, healthcare, and political governance. However, the remnants of organized crime shifted its focus toward Africa as Europe became more capable of detecting and preventing internet-based crime and attitudes towards some recreational drug use became laxer. Through its association with African nations, Europe limited the Chinese dominance in Africa and reduced migration pressure.

All these changes, brought by technology, and the fluid connection between nations gradually led to the development of a uniform culture built on role models defined in a globalized social media system. One could believe that humanity had overcome the basic problems associated with inequality and health. Finally, driven by the beliefs and trust of the new religions, it was the right moment for the UN nations to work together to address the next step in technology evolution, to conquer other planets in the solar system and to drive and augment humanity to become a Type 2 civilization.



Business as usual?





Business as usual?

By the end of 2021, the pandemic crisis caused by the SARS-COV-2 virus was under control in the EU and worldwide by the end of 2022. A feeling of cheer and relief seemed to traverse the world like a tsunami. European citizens were able to travel freely again. Cafes and restaurants in picturesque villages and cities were once more packed with customers. One could smell fraternity in the air, as if tourists were actually visiting some close relatives that they had not seen for long.

Regrettably, that only lasted a few months. The EU failed to coordinate its economic and political recovery priorities, leading to internal tensions between its members, while the whole continent remained dependent on external providers for critical raw materials. Migration towards Europe increased and the failure of the EU to mitigate the situation only led to adding more tension to the already strained political setting. Across Europe, nationalistic and protectionist policies were gaining strength. The future of the European Union seemed increasingly uncertain.

Some anti-European leaders pointed at the UK as a reference of success outside the union. In turn, the UK maintained relatively close relations with Europe in areas of mutual interest such as security and fighting organised crime, although it strengthened its technology ties with the USA, Canada, Australia and India, especially in green technologies, raw materials and healthcare.

Meanwhile Russia continued eroding the EU stability by increasing its military capabilities and through grey war, inflicting frequent cyberattacks on European interests and trying to disrupt societal relationships through social engineering based on disinformation campaigns. The preoccupation of Russia for Europe was seen by China as the perfect opportunity to reinforce its influence in Asia, Africa and Australasia. Due to the weakness of the EU and erratic US foreign policy, Chinese activities received little international response.

In the US, a charismatic but unpredictable leader emerged. In 2040 the country was on the edge to modify its constitution to allow a president to be re-elected indefinitely. The principles of strategic alliances between geopolitical partners shifted due the aggressive US strategy towards its former allies. These political tensions brought the world to a stagnation point resembling that of the Cold War, only that this time nobody could know for certain how many blocs were opposing each other.

However, given that no single country could gain a decisive dominance in AI-enhanced weaponry, there was an improved adherence to the International Humanitarian Law (IHL) and the international treaty on use of Lethal Autonomous Weapon Systems (ITLAWS). This had dramatic consequences that would radically change the features of warfare. For a start, the use of armed force became more targeted, which resulted in saving the lives of non-combatants. Also important, in the event of a machine combatant fighting a human adversary, the machine was programmed to focus on disabling soldiers rather than killing. As for non-human targets, the new warfare led to less destruction of property, since operations were carried out dually, in the physical context and in the virtual one, the latter focusing on remotely disabling infrastructures instead of destroying them.

The lessons learned from reaching agreement on the IHL and ITLAWS and from their enforcement pointed out that reaching consensus on nuclear disarmament was also possible. With this



motivation, and as an unforeseen consequence of the geopolitical scenario, the general nuclear disarmament was reached. This came as a result of several facts. First, the complex global political dynamics, characterized by a multitude of actors with access to nuclear technology was deemed too big a threat to be ignored. Moreover, the technological means to enforce the agreement were already there: the Al-enhanced detection systems had reached a degree of sophistication that made them able to verify nuclear re-armament programs at their very inception.

Burdened by centuries of fossil fuels use, the world decided to react and all nations raced to invest in renewable energies. Advances in solar and biomass technologies brought down capital and production cost, paving the way toward decentralized energy production. The proliferation of local energy producers around Europe altered the relations of the union with oil and gas-rich countries.

Unfortunately, these initiatives only started when climate deterioration caused by human activities was recognised as the direct cause of extreme weather events taking place around the globe. The slowdown of the thermohaline circulation in the Gulf Stream caused lower temperatures in continental Europe. Meanwhile, vast areas in the Amazon rainforest were deteriorating into a shrub savannah due to the disruption in the air circulation that brought nutrient-rich Saharan dust over the Atlantic Ocean to South America. The rapid deforestation process provoked massive fauna migrations that caused various zoonotic outbreaks in the Amazon basin with potential to expand to larger areas.

The decline of bees and other pollinators due to the combined effects of climate change, habitat deterioration and intensive agriculture led to the gradual disappearance of various crops such as fruits, nuts, and certain vegetables. Farmer replaced these cultivars with staple crops of much less nutritional value like rice, corn or potatoes. The shift in agricultural production led to a general deterioration of health and life expectancy due to an imbalanced diet. Unable to provide their citizens with the required nutritional supplements, poor and developing nations were the ones that most severely suffered the nutritional crisis.

Surprisingly, these health issues were not a great concern in society. Due to the extensive use of social media, national governments were able to play down the risks by the use of misinformation. Malicious actors and opposing powers also used social media to harm EU interests, from institutions and member states governments to large EU companies or celebrities. Despite attempts to regulate the use of AI in Europe, AI-based technologies were instrumental in disinformation actions. Among them, the video synthesis capabilities of generative adversarial networks evolved to such level that they could mimic actual individuals in their speech and movements in a way that human experts could not differentiate them from real ones. Manipulation actions reached the point of changing the results of elections, the behaviours and attitudes of citizens (notably toward vaccination), and even the share price of companies.

The EU appointed a multinational counter-manipulation brigade to infiltrate disinformation groups and to develop instruments to detect and eliminate fake content in cyberspace. Privacy protection groups lobbied against the interference of European defence institutions in network communications. Some of these groups were suspicious of being infiltrated by opposing nations and cybercriminal organizations.



Darwinian Games





Darwinian Games

Some would say it all began as a game; others that it was some sort of a protest. What is certain is that in 2017 Josiah Zayner injected himself with DNA-modifying solution based on CRISPR/Cas9 in front of an audience at a biotech conference. This was how it began. Only a few years later, everybody could get their CRISPR gene editing DIY kit shipped home for less than 2000 €. The authorities tried to regulate this, but regulation always lags behind innovation, and who can prevent people's mind-sets from changing? With the pandemic crisis and its real time broadcasting of the scientific battle against the virus, society became aware of what biotechnology was really able to do. Molecular biologists and bioengineers became role models for young kids searching for their own heroes. Who could blame them? It is only fair that one shows gratitude toward those who saved society. But did they really save society? Not long afterwards, the progress made in bioengineering and high-performance computing made genetic modelling and manipulation widely available techniques at low cost. They were extensively used to increase productivity in the primary and secondary sectors and to cure disease. However, the access to cutting-edge biotechnology tools was also open to individuals and private companies providing high quality gene editing services, but only to those who could afford it.

Biotechnology and computational biology became the panacea that could cure most conventional diseases by developing personalized treatments based on genetic editing, tailor-made drugs, stem cell engineering, synthetic biology and organ printing. Genetic manipulation even reached a stage where modifications could be made temporary by undoing the changes with a good degree of safety. Biotechnology was seen not only as a means to mitigate human suffering, but also as a tool to enhance human beings, to make them stronger, faster, and resistant to infection or even radiation. Some privileged persons fulfilled their dream of living an amphibian life through the use of printed biocompatible water-respiration exo-organs, and genetic manipulation allowed them to decrease their oxygen requirements. Others paid for embryonic stem cell surrogates as sources for spare parts and enhancement such as extra production of brown lipid tissue to be able to withstand freezing temperatures and explore the poles and the highest peaks without the risk of frostbite. Top level biotechnologists and computational biologist were hired by the military to provide elite troops with the latest human enhancements.

Genetic modification was extensively used to increase crop yield with minimal mineral resources while making plants immune to plagues and drought. Biotechnology was also employed to increase the digestive efficiency of ruminants by engineering the microbiome of cattle to increase their capacity to break down cellulose. Livestock numbers worldwide decreased drastically following the lower demand for meat that resulted from the availability of an extensive variety of laboratory-grown and 3D-printed meat. The reduction in demand for fertilizers for intensive agriculture, the decrease in livestock and the reduced need for fishing gradually reduced the emissions of the agricultural sector and contributed to improve environmental health. Moreover, synthetic biology contributed to improve photosynthetic routes for the production of organic biomaterials and biofuels at high rate from atmospheric CO2 and sunlight, contributing thus to mitigate global warming and plastics scarcity following the decline of oil reserves. Overall, not all developments made possible through biotechnology entailed daunting end ethically questionable consequences. Environmental health improved, oceanic pollution decreased and global warming was mitigated.



Nonetheless, the natural equilibrium was at risk. As a grotesque amplified reflection of past events of natural disruptions by invasive species, a plethora of newly created species and genetic chimeras, and XNA-based new life forms were released or escaped into the environment. Although most of the new creatures were unable to survive in the wild and not all were fertile, all ecosystems in the world were affected. Ecological brigades were created in all countries to monitor natural and rural areas to control the new species.

The might of biotechnology brought dramatic changes to society. Although genetic modification had been accepted as a way to secure prosperity, the effects of genetic chimeras on the environment provoked the raising of dissident voices. Groups of activists, the genopuritans, grew steadily around the world, united by the common aim of bringing back genetic purity. Some of these groups, categorised by the states as terrorist organizations, carried out sabotage actions on compounds housing genetically modified crops or livestock. Aggression against genetically enhanced humans was becoming more and more frequent.

For mainstream society however, genetic modification was a blessing. Those who could pay for it could have their life extended, or they could live an unhealthy life without worrying much about the effect on their health. They could even modify their bodily features at will, creating new ideas of beauty, or to enhance their physical capabilities. In sport competitions, genetic editing was considered doping only if the modifications surpassed a certain threshold. Those who could not afford to pay for professional gene editing services could always do it at home with personal kits that integrated advanced laboratory equipment with bioinformatics software. Although national governments could no longer forbid genetic self-editing, most EU countries issued regulations to oblige those patients injured by proven misuse of self-modification kits to pay their own health treatment bills.

In response to the genopuritan movements, genophiles evolved, small communes of biohackers scattered across the now deserted countryside of Europe. Although pacific, the majority of groups professed some sort of transhumanist doctrine involving a rite of passage through which the individual abandoned his/her human status to become transhuman by a combination of genetic immortality and up- and downloading of human memories through brain-computer interfaces.

Nation states struggled to control the genetic integrity of these communities, especially the most radical groups, in order to prevent the advent of transhuman speciation events and to ensure that the groups were not aiming at non-solicited modifications of other individuals, their animals or their plants. As a result, the Silent World War, formerly restricted to the cyberspace, saw the onset of a new front in which the fight was to take place inside the cell. In view of the threat to the world's stability, the UN members signed in 2035 the Edinburgh Treaty on Gene Warfare, a watered-down agreement on the prohibition of manipulating the human, animal and plant genomes of other nations or groups through the use gene drives. Despite this, competing nations and non-state actors started inflicting stealth attacks to alter cultivars, livestock and citizens with the purpose of destabilizing the opposing factions. Arthropods, microorganisms and foodstuff were leveraged as silent biological vectors to induce malicious genetic modifications. Genetic integrity became a continuous concern, bordering on the paranoia. All capable nations appointed fast intervention bodies to implement quick counter-manipulation measures like reverse gene drives that themselves imply genetic modification of organisms and human beings. But changes could only be detected if all genomes were known, driving a frenzy of DNA sequencing in order to account for all the genomes found in a society, leaving little space for privacy.



Humanity vs. The Hungry Beast





Humanity vs. The Hungry Beast

The fierce fight between technology giants to dominate supercomputing ended up with no clear winners - or was it humanity who won? Whatever the case, the middle of the 20's saw the second computing revolution. Hardware became so cheap that supercomputing was available everywhere, to everybody. Employed to implement, train, and operate large artificial intelligence systems combined with a ubiquitous sensor network system, it permeated all domains of society, from transport to finance, from education to elderly care. However, the benefits brought by this technology came at a cost – supercomputers were power-thirsty beasts that required immense amounts of energy to operate. But their appetite was not only for energy. The frenetic demand for cheap hardware led to an exponential production of semiconductors and energy storage systems, which required vast amounts of mineral resources and water to be manufactured. The consequent massive global energy and resource consumption rapidly increased deterioration of the environment and exacerbated climate change.

To increase supercomputing efficiency, the immense datacentres required for a computationhungry economy were gradually moved to polar and subpolar areas where cooling could be achieved at a lower cost. These facilities represented a steady source of income for the countries that housed them. Those nations lobbied together against countries willing to relieve pressure on energy resources by imposing limitations on the use of supercomputing. In addition, just before the beginning of the 30's, the world witnessed the transition from an economy based on fiat money to one based on cryptocurrencies. The valuation of cryptocurrencies and the related "mining" costs became the defining factor for energy prices.

Local communities around the world blamed the tech giants and crypto miners for the high prices of energy, water, and food, and for the associated hyperinflation. Data centres and currency miners were frequent targets of attack by enraged communities leading the data giants to deploy armed guards patrolling their compounds. Initial pockets of social unrest began to cooperate and the possibility they might crystallize into large scale revolution organize by radical actors became a real threat.

Europe, the former environmentally aware union, did not react in time to mitigate the climate and natural environment deterioration induced by the data industry. Although having laid down a very ambitious Green Deal, the plan only led to timid incremental improvements as the runaway demand outpaced efficiency gains and integration of renewable energy. As a result, the agricultural sector was severely hit by climate change, the ban on fossil fuels and the increased cost of fertilizers. The total agricultural production in the EU experienced a drastic reduction and became unstable. Such uncertainties led society to accept genetic modification in an attempt to maintain agricultural production. Seed companies successfully engineered crops capable of resisting drought and intense frost events, although at the expenses of lower production yields. Europe's long-time stronghold in food security had disappeared and the union was forced to import much of its foodstuff. European citizens were required to pay twice or thrice more for their food than in 2021, contributing to an already escalating inflation.



This exacerbated the flight to cryptocurrencies as the only viable solution, leading to the loss of state control over the money market and national economy. The data companies were only to ready to fill the gap, controlling as they did access to the cryptocurrency mines and the technology to buy and sell cryptocurrencies. Taxation as a means to finance national infrastructures became ineffective, which inevitably to crumbling roads and bridges, deterioration in healthcare facilities and unpredictable breakdown in the water and sewage systems.

Faced with this scenario, the European Union began to consider the agricultural sector a key asset to regain economic stability and to guarantee survival in the event of an armed conflict or a natural catastrophic event. The union defined several regions to become strategic providers of staples to maintain food sovereignty. Additionally, large reservoirs of staples were maintained to buffer the food market in order to dampen price oscillations and as a reserve in the case of war or other disruption in supply. Food security had become a national security concern and a collegiate body integrating military from all EU nations was created to organise and defend the strategic food-related infrastructures.

The world's climate passed the tipping point and entered a chaotic phase that would last centuries before reaching a new and uncertain equilibrium. In this era, the frequency of severe droughts, cyclonic storms, heat or cold waves was at its maximum. Ice melting led to the inundation of small island countries and the loss of significant land to the sea in continental countries. Large areas in India, the Middle East and The Maghreb, became inhabitable due to high temperatures or to the lethal combination of humidity and heat. Insect infestations became more frequent, and new diseases developed. Large scale migrations caused when regions became uninhabitable, drought and agricultural collapse sparked a draconian response and global immigration restrictions.

As global warming progressed the Arctic became navigable almost all year-round, evolving from a natural barrier between competing nations to a vital corridor that bridged the Atlantic and Pacific Oceans. The Artic became not only an important strategic area, but also a promised land for countries avid for new resources, even for those far outside the Arctic 8, such as China and India. The EU leadership recognized the strategic importance of the Arctic following the recommendations of its two members with representation in the Arctic Council. Having become a focus of global attention, the peculiarities of the Arctic area and the need to secure and control access to marine waterways and underwater resources created a stream of new defence technologies designed to operate in harsh marine conditions. But this was not the only "weather challenge" defence experienced. A large array of new technologies was conceived to be fully operational in extreme heat, heavy rains or cyclonic winds. Some defence systems, such as unmanned vehicles were designed with the capability to morph into the mode - aerial, terrestrial or aquatic - that best suited the situation.



Additional Futures summarized per dimension No free will (Major breakthrough on quantum, change of world power)

No free will (Major preakthrough on quantum, change of world p

Social dimension

Quantum technology has advanced and resulted not only in a surprising revolutionary findings and development of new supercomputers and quantum cryptography. But has also found the answer to the "hidden variables" Einstein was looking for and quantum mechanics behaves like normal mechanics in a deterministic nature.

Randomness does not exist. Everything is predictable and understandable. Free will does not exist. The world develops according to predefined trajectories. However, this information is known only to a limited number of individuals who control the means to calculate such complexity through AI and supercomputers. These individuals have become the gods of the world who can calculate the past and the future and therefore are the ultimate Future Teller.

All data from your phone, cameras, your smart home, everything, is constantly recorded, collected, and made searchable for anyone. We already have the technology for doing this. In this future your employer would know what you said about the company in your own home, your jealous partner would be able to search for faces of all the men/women who made you smile that day, and governments could search through conversations you have had years ago.

Geopolitical dimension

One or two large nations have taken control of the World through information superiority and use of CBRN measures. Whilst many countries were pursuing the above ambitions, less honourable nations were developing controlled means to spread and contain chemical and biological weapons as a means of control whilst simultaneously controlling the minds of the wider public through the cyber corridors and information platforms. Cyber diplomacy is the new diplomacy in a paralyzed world.

Quantum computing and other quantum technologies (such as sensors) become practical to a few European nations and the USA. China might also make a major breakthrough, but this seems less likely. Quantum capability will shift the balance of power to those nations due to their capability to decrypt information which was previously secure. Depending on the nations with quantum capability this may lead to strengthening of existing alliances or completely new alliances.

It is unclear what consequences this development may bring. If the capability is available to unfriendly nations this could lead to major negative consequences for Europe.

Economic dimension

Quantum is getting real. No traditional encryption protocol is enough to protect our governments, companies, etc.

People have stolen defence secret data with traditional encryption ten years ago. They can now use the data, because the quantum helps them crack the code and use them.



Technology dimension

Artificial intelligence, augmented intelligence, combination of technology in the human domain: Combining facial recognition with DNA specific patterns, will allow an artificial intelligence to select humans based on ethnic typical features, genetic specialities.

If this is combined with cameras and autonomous platforms, there will be an ultimate surveillance system. If that is combined with autonomous weapon systems and the AI will direct it to targets, there will be a very disruptive opportunity to control riots, identify friend of foe, target specific audience etc.

Augmented intelligence can massively improve how we learn, what we can learn, remember more. It can also be a means to target thoughts, memory, influence what we now, perceive and believe. Brain-machine interface has the potential to hack the brain, enhance brain function, upload or download information.

Defence dimension

Defence becomes focused on Counter CBRN measures and Cyber defence and offense. The old tactics of Guerrilla warfare where the 'winning of hearts and minds' & public support and intelligence gathering were crucial, become the battle ground of conflict in 2045.

An ethically unscrupulous power gains a decisive advantage in Al-enhanced weaponry. Not having a serious military adversary, this power is able to impose its will on and within other countries. The entire world, and all individuals in it, are now under constant surveillance through Al-enhanced detection technologies. Any unauthorized movements, of individuals and groups, can immediately be stopped. Preventive measures are implemented to identify would-be violators even before they proceed to action.



A world without touch (Pandemic world)

Social dimension

When humanity was on the brink to move forward in new technology interaction areas, it became evident that the human species is most vulnerable to inherent ancient risks to life arising from pathogens which are still unresolved. Being RNA viruses, Coronaviruses were capable of mutating at a pace that vaccine programs could not keep up. Furthermore, a series of laboratory accidents involving gain of function studies and intentional release of new variants by malevolent actors have resulted in 20 years of lock-downs and opening ups of the societal life, economy and educational institutions the world has transformed.

The human species as we know is on the brink of collapse. Outside the family bubble, humanity interacts only through social media and has seriously transformed society and blurred the virtual and real world.

A small group of rich countries have control over a rapidly adjustable vaccine program to maintain a minimum QoL and survive. In contrast, the population in most developing countries has been severely decimated. The state of mental health of much of the global population can no longer be addressed and depression, violence and aggression appear at all levels of society in these countries.

Alternative life forms are actively developed and have replaced humanity in many areas.

Automation and robots replace millions of jobs worldwide (pandemic accelerated this transformation) and digitalisation offers new types of jobs for all global citizens.

Geopolitical dimension

The economic recession resulting from the pandemic crisis plus the loss of unqualified jobs driven by an increased automation of production and services becomes the perfect culture broth for the rising of national populist movements in Europe. European nations start exiting the EU and smaller countries to adhere themselves to the United States, Russia or China.

Technology dimension

Critical technology drivers are:

- Medical area: new vaccine technologies, faster vaccine testing technologies, human gene editing to reduce infection risks, Al based vaccine development, an increase of psychological disorders.
- Social area: Compensation for loss of social interactions and the reliance AI based companion (e.g., robot dog, androids, sex partners)
- Information Technologies: virtual interactions through social media, virtual reality-based entertainment,
- Workplace: acceleration of robotics and automation in production and delivery systems including UAVs, UGVs which requires little human intervention.



Economic dimension

The economic recession resulting from the pandemic crisis plus the loss of unqualified jobs driven by an increased automation of production and services.

States have been forced into printing money to keep alive, which has resulted in hyperinflation and the rise of alternative currencies and barter systems.

Ethical dimension

Fearing more pandemics, people become afraid of touch and personal communication. We make contact with the help of touch. Sensitivity to feeling - the principle of contact - characterizes every organism. It is an elementary mechanism that guarantees survival.

Touch means contact. A world without contact and touching will affect the human psyche, causing him to become dull and fall into an emotional collapse. Losing the ability to feel touch is one of the hardest losses you can experience. Touch compensates for the deficiencies of other senses, but no sense can compensate for touch.

Touch stations will appear. Man should always be treated as the highest good, and his rights should be the guiding idea of the state. Due to the lack of touch and communication, people will lose their humanity because they will cease to be individualists.



Future Corp. – New world order (Artificial intelligence understood by humans as God)

Geopolitical dimension

Artificial intelligence and connectivity permeate all domains of society. Giant technology companies became increasingly powerful, spawning their influence in all strata of society including governing bodies. At a point, these corporations merge in the shadow into a single one that acts as de facto government in the Americas, large parts of Africa and in small Asian countries exerting economic control and media manipulation.

The fundamentals/principles of World governance failed. UN and related bodies were contested and has been dismantled. The traditional Judaeo-Christian order inherited from Athens and Rome had suffered a severe step-back over all continents but Europe which remained focused on its core values. Nationalism has taken over regional alliances, exacerbating border conflicts for resources (energy, water, unpolluted air) with an additional threat being nuclear proliferation.

Ethical dimension

Whether consciously or unconsciously, we all live by our most basic understanding of who God is. It is our knowledge of God that ultimately determines and governs and governs everything in our lives.

What if it's AI? What happens if artificial intelligence becomes God. If he takes over his attributes. What if people think he has the qualities of infallibility and eternity? Some of the qualities such as omnipresence, immutability, wisdom, goodness, knowledge can be assigned to a new God. So, a new religion will arise.

The advent of a new religion related to artificial intelligence will give birth to a new society. How will the world change, will there be religious wars supported by computers believing in their infallibility?

Defence dimension

The failed augmentation of our pilots and soldiers / Al going wrong: The EU has bet on augmented pilot, augmented soldier, etc. Al is assisting in decision making real time. But Al is starting to go wrong. We don't know what is making it deviate. But the pilot or soldier receive wrong Al assistance.

There is a declining adherence to IHL as a result of AI-enhanced weaponry. No single country gains decisive dominance in AI-enhanced weaponry. Many possess such weaponry, including non-state actors, and military competition intensifies through its use. What will be the implications for adherence to humanitarian norms of war? In this future we will consider how fundamental norms are weakened through deployment of AI systems. Increasingly large swaths of society, civilian and military, are now regularly exposed to armed hostilities. Use of hypersonic missiles, for instance, mean that no one is safe anywhere at any time. Government and military officials, who are especially targets of attack, must live underground.



Dependency on digital transmissions (human-to-human and the internet of things) becomes a major liability as such systems are now at the mercy of hostile powers. Al systems now handle strategic decision-making, even with respect to nuclear weapons, making the possibility of catastrophic outcomes an ever-present danger.



LongCovid's long arm

The pictures of the 4th of May 2023 resembled that of V-Day. Exuberant masses on the streets, dancing, hugging and kissing. Big bonfires where people all burned their masks. Finally, the world had officially beaten COVID-19! We all thought it was over. How could we have been so naïve?

Social dimension

Even though no one died anymore from COVID-19, we still carried its remnants with us. As it had taken so long to combat the pandemic, the disease continued to mutate. Therefore, despite all our efforts to continuously adapt our vaccinations, 91% of the global population contracted COVID-19 at some point. The overwhelming majority did not become acutely ill. But the consequences would only become visible over the long term, as slowly our joints deteriorated and broke down completely. Physical therapy was booming, and rheumatology became the highest paid medical specialty. But it wasn't enough, as people struggled to move around as they had done before the pandemic. Manufacturing and agriculture were in dire straits, as the share of the population with sufficient strength and endurance decreased every year. Some governments had even introduced a mandatory civil service for all 18 years to do physical labour for one year, as the workforce shortage had become so acute.

Technology dimension

Shiny Armour Inc saw an opportunity and jumped in. It rebranded its exoskeletons developed for the EU army in the Second Cod Wars as Survivor Shields [™]. It was an astounding success, as finally, people could move, work and carry weights again like they had before. The crutches and wheelchairs that had become such a common sight were quickly replaced by exoskeletons in every colour of the rainbow. Other defence companies saw their success and quickly followed suit. However, quality control quickly deteriorated to keep up with the enormous demand. In their rush, one major problem was overlooked. You see, the exoskeletons had been made initially for special forces fighting cod underwater and were developed for use off-the-grid. But the exoskeletons developed for the civilian markets were permanently connected to the Cloud to facilitate updates. However, nobody realized how fragile this data link was, until the state-sponsored enemy hackers hit.

Geopolitical dimension

It's one thing to refuse to pay a hacker if it takes control of your computer. But losing control of your body is a whole other thing. As tens of millions of people were frozen in their exoskeletons in the middle of the streets, how could governments resist the enemy demands?

Defence dimension

Europe's aging population (a consequence of medical advances) and declining demography (a consequence of birth ratio below 1) led to a situation where young adults will soon be a small part of the population. They are not willing to join the European armed forces anymore. Besides, the spirit of defence and associated willingness to accept the loss of lives has totally



declined. Technological breakthrough were really great and European military systems are top of the notch, but it can be used. As a consequence, European military strategy is evolving in 2040 towards a "zero dead" strategy precluding troops to be deployed in operations. All now hands off (unmanned systems) and Cyber.

Meanwhile, Europe has been increasingly under pressure from the US to buy American military systems, with unfair and unacceptable attempts to weaken the European defence industry. As a result, Europe is now fully aligned with Russia and they developed a common strategy to resist to China and US attempts of ruling the world to their own benefits. The possibility of a major military conflict between China and US has never been that close and Europe/Russia intend to protect their value, their people and their economy.



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