

**BUSINESS
FINLAND**

capful 

BUSINESS FINLAND SCENARIOS



SISÄLTÖ

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INTRODUCTION (1/3)

Starting points for the project

WHY SCENARIOS?

Our global operating environment is changing rapidly, challenging our ability to seize opportunities and prepare for challenges. Foresight, and scenarios as one of its methods, at best strengthens these capabilities.

In summer 2019, Business Finland initiated an extensive scenario project on the future alternatives of Finland's competitiveness. We turned our gaze to the year 2030 and tried to describe and understand alternative development paths of the global operating environment from the perspective of the Finnish business sector and innovation environment.

In industries with many discontinuities and genuine uncertainty, scenarios can help grasp the change. Often, our thought models need renewing, and the tool box should be packed with equipment that helps process the uncertainty in an analytical as well as a creative way. In the scenario project, the aim was to challenge our current way of thinking and also create scenarios that include significantly diversified views of potential development options.

The scenarios presented here are descriptions of potential future scenarios of the external operating environment concerning Finland's competitiveness from the present until 2030. Rather than being predictions of the future, they are aimed at developing insight.

The purpose is not to select one scenario by ranking the scenarios according to probability or preference, but rather to discuss the big picture formed by the scenarios. The actual courses of events that will happen in the future are often combinations of different scenarios.

INTRODUCTION (2/3)

The focus of the scenario project

The strategic questions that guide the scenario project:

1. CHANGE IN THE GLOBAL OPERATING ENVIRONMENT

- From the perspective of the competitiveness of the business sector, how do the potential future operating environments look like from the present until 2030?
- Where are the attractive markets and growth opportunities for Finnish companies in the future?

2. FINLAND'S COMPETITIVENESS AND THE ROLE OF THE PUBLIC SECTOR

- How do we ensure the competitive development of the business sector in an uncertain global operating environment?
- What is the role of the public sector?



INTRODUCTION (3/3)

Method

Business Finland takes the responsibility for the content and the choices made. Business Finland would like to thank the following organizations and operators for their cooperation and for sharing their expertise and views during the process:

Aalto University, CLIC Innovation Ltd, Econet Ltd, the Confederation of Finnish Industries (EK), Etlatieto Oy Ltd, participants of the Finnsight 2019 foresight forum, Fortum, University of Helsinki, Kemira Plc, Central Uusimaa Business Development Centre, Finnish Forest Industries Federation, Netox, Novago Business Development Ltd, University of Oulu, Service Sector Employers Palta, Posintra Oy, The Finnish Innovation Fund Sitra, Spinverse, Academy of Finland, Association of Finnish Municipalities, Stora Enso Plc, SEKES – Association of Finnish Development Companies, the Federation of Finnish Enterprises, Superson, Technology Industries of Finland, members of Team Finland's Advisory boards, Ministry of Economic Affairs and Employment of Finland, Ministry for Foreign Affairs of Finland, UPM, Vaisala Plc, The Finnish State Development Company, the Prime Minister's Office, VTT Technical Research Centre of Finland.

We hope that our joint work benefits the foresight discussions of all organizations involved!

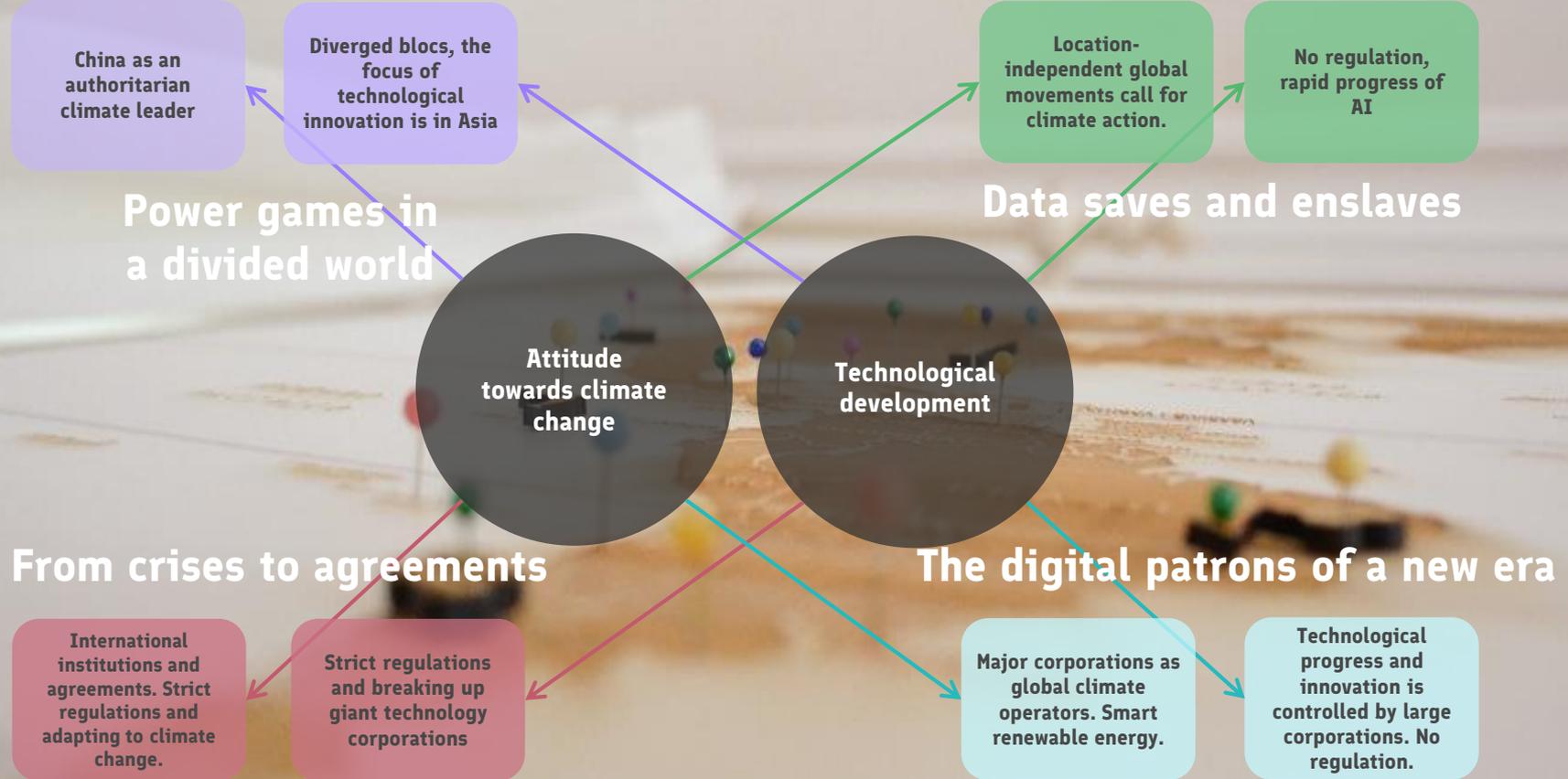
IDENTIFYING THE DRIVERS OF CHANGE

The project started by identifying key themes and drivers of change. The factors of the external operating environment were classified based on research and project group work as well as by inviting personnel and stakeholders to participate in the scenario workshops. Changes were identified on a general phenomenal level as well as through the current thematic choices of Business Finland (workshops' change driver cards are attached). Uncertainty factors are at the core of the scenario project. The development options of these influential and uncertain factors create the building blocks for selected scenarios.

A futures table was used to define possible development options for each uncertainty factor, analyzing how this factor could develop until 2030 in different ways. After this, the intersections and compatibility of the different development options were tested with the Scenario Builder™ tool designed for building scenarios. This analysis helped to identify different, radical scenarios that had logical content and were relevant to the focus. Scenarios, their development stages and cause and effect relationships were described with a timespan reaching until 2030. Of the millions of possible combinations in the futures table, the project group selected four that are presented in this document.

In addition to uncertainties, there are several megatrends (for instance, the aging of the population and global warming) that have impact on all scenarios. The impact of these megatrends on our future is indisputable. However, because the aim of the scenarios is to understand the uncertainties of the future, these megatrends have not necessarily been emphasized in all scenarios. The list of underlying megatrends and change drivers are listed in the attachment 2.

CRITICAL CHANGE DRIVERS



1	2	3	4	5	6	7	8	9	10
The future of the EU	International agreements and relations between the great powers (incl. trade wars)	Sustainability of the economic system	Transformation of work and competition for talent	Global climate decisions (incl. companies and individuals)	Energy availability and production	Focus of technological development (incl. global platforms)	The future of production (incl. location, material circulation)	Change in consumption	Data ownership and use
Economic slump in Europe and the erosion of the EU's power The economic crisis drives the EU into disagreements	Triumph of democracy International institutions retain their role. Coalitions of rule-based states.	Segregation of well-being and economic growth The significance of central banks decreases radically – experimental monetary politics (the expanding role of companies)	Local creation of value and job security Employment for all supported by states, little labor mobility	Global and coherent climate policy strongly steers People awoken to the global crisis and a functional international framework is created for a climate agreement	Electrification and a transformation in the energy system The development of energy storage system and “free” renewable energy, local energy markets	Platform war and regional blocs National interests steer development (e.g. EU+USA vs Asia), a few super platforms	Streams of raw material steer production location decisions Locating near raw materials and circular economy hubs	The consumption of services and goods defines identity. Digital and analogical services increase inequality	Technology giants as creators and controllers of data Closed platforms and the centralization of power in the hands of a few major operators, great regional differences
Strong mutual dependency The shift towards a federal state picks up momentum	The role of nation states diminishes International companies create global standards, which approaches supranational legislation.	Feeble balance The current feeble balance remains and is prolonged – the significance of fiscal policies is emphasized as methods of monetary policies decrease	The polarization of the labor market and gig economy Traditional paid employment remains valid as the labor market polarizes	China as a climate leader China has an effective leadership position with respect to tightening emission limits and investments	A centralized, traditional energy system Electrification takes place gradually on the terms of traditional players, a state-led system	Violent breaking up of markets The power of technological giants is restricted, data security and privacy are guiding principles. The EU and the superpowers create the rules.	Local small-scale production, price does not determine location decisions Transparency in production increases in significance and guides location decisions, high level of automation	An illusion of responsibility Quality consumption increases. Companies engage in greenwashing. A transfer from ownership towards a sharing economy.	Supranational regulations regarding the security of data use Ethical principles of data use
Position weakens and relationships crumble Power to steer and role in international decision-making decreases, radical openings from member states.	The focus of international cooperation moves East China assumes the US's role as the leader and funder of institutions	Releasing from the power of central banks Instead of national currencies, citizens choose to use cryptocurrencies	Work on digital platforms and in virtual work environments. The competition for top talents grows fiercer. The employer is more significant than the profession.	Corporation-led development The role of corporations in climate actions increases in lack of global agreements	An international networked energy system. New parties have entered the market, and the market is unstable.	Development defined by large corporations Increase of open giant ecosystems, standards created by corporations and self-regulation (Big Techs).	New materials and printing technologies enable home production New materials and printing technologies enable locating production close to demand.	Gradual development towards sustainable consumption Sustainable thinking grows stronger. More regulation, e.g. steering consumption with taxes.	The position of individuals as data owners is emphasized Personal data as a medium of exchange
The EU turns into an insignificant pseudo-institution The power of other players increases, and the EU becomes a regulatory body for corporations	Trust in international agreements collapses Decision-making is fragmented and bilateral arrangements gain popularity	Asian Monetary Fund Problems in the Asian economy drive Japan, China and India to establish the Asian Monetary Fund	“The spectre of uselessness” Explosive development of automation and mass unemployment, work can mean services for community (time banks)	Direct democracy by utilizing AI Data collected of individuals steers global climate decisions	Decentralized and optimized energy system The energy bill of data transfer increases (price per bit), environmental impacts increase.	Fragmentation of platforms The field is fragmented, no clear position of power. Quickly developing new technologies all over the world	Economies of scale and large production units. The prices of factors of production determine locations. The price of technology and competence, in particular, steer location decisions	Collapse of consumption when there is no other alternative Extreme phenomena have forced us into solutions. Strong regulation and a society based on bans and prohibitions.	Uncertainty in data use increases Misuse of data, cyberattacks, solutions become more local and national interests are highlighted.

SCENARIOS

Part 2

SCENARIOS

1

**Power games in
a divided world**



2

**Data saves and
enslaves**

Data has a better idea



4

**From crises to
agreements**



3

**Digital patrons of
a new era**



SCENARIOS

POWER GAMES IN A
DIVIDED WORLD

The trade war intensifies and **the worlds become divided** into two digital blocs and trade areas.

China's economic growth accelerates and **China dictates the rules of international trade and cooperation.**

China spreads surveillance capitalism and introduces strict system of social & climate credit.

China uses climate policy to promote its interests and increase its influence internationally.

The focus of climate policy shifts to Asia.

The European economy becomes recessionary, Rifts within the EU's deepen further, its global position is weakened and international investments decline dramatically.

Increase in cyber attacks and information warfare.

DATA SAVES
AND ENSLAVES

Trust in the existing international institutions wavers and people call for opportunities to exercise global influence on global challenges.

A forum for global citizens' initiatives is established and there is a shift towards decision-making driven by AI and algorithms.

The need for labor is reduced as a result of radical technological progress and traditional paid employment loses significance.

Earning income from the use of personal data becomes possible. Only a few people have the luxury and possibility of breaking away from digital devices.

A new class division based on **digital competence.**

Cryptocurrencies replace traditional money issued by central banks.

DIGITAL PATRONS
OF A NEW ERA

Responsible capitalism is emphasized in corporate activity.

The size of major corporations increases radically and giant conglomerates are formed across the boundaries between sectors and industries.

Giant corporations assume a growing role in decision-making as the relative significance of the nation states diminishes.

Giant corporations own and govern their own cities, where they **provide services to their employees and the broader community ranging from education and healthcare to housing.** People strongly identify themselves with their employer.

Regions and populations become polarized between the members of the giants and the non-members.

Energy transformation and a revolution in energy storage.

FROM CRISES TO
AGREEMENTS

Major crises shake up the world and global agreements assume an increasingly important role in responding to the challenges. **Global climate policy control instruments are introduced.**

Technology giants and the use of data are regulated internationally and the significance of digital ethics is highlighted through crises.

China's international bargaining power is reduced when the Chinese economy stalls and internal crises are exacerbated.

The strong mutual dependence within the EU leads to a shift towards a federal state.

The democratic contract society becomes stronger and the popularity of representative democracy increases, particularly in the Western world.



POWER GAMES IN A DIVIDED WORLD

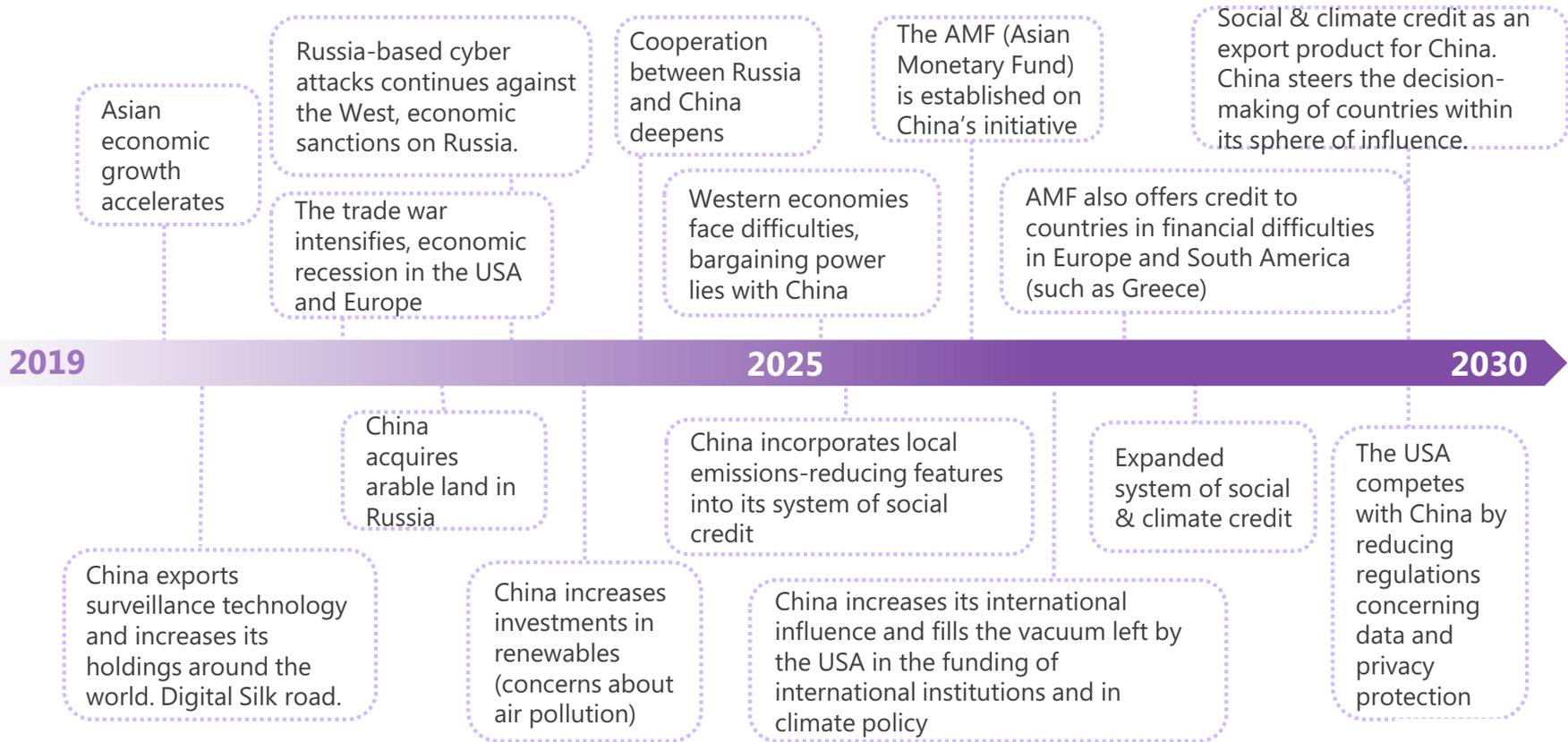
SCENARIO 1: A DIVIDED WORLD

Climate	China as an authoritarian climate leader	<p>Strong economic growth in China. The trade war continues. Belt & Road and the digital silk road expands.</p> <p>Bargaining power in China. Democracy appears weak.</p>
Technology	Diverged blocs, the focus of technological innovation is in Asia	<p>The world becomes divided into two digital blocs. Europe's digital eastern border. Divided Internets.</p> <p>The use of surveillance technology spreads from China and becomes increasingly common. Personal carbon allowances are included in the social & climate credit system.</p>
Power	A bipolar world divided into blocs. Growth of China's power.	<p>The focus of climate policy is in Asia.</p> <p>Recession in Europe and in the USA. EU is losing coherence after Brexit and it's global role weakens. Investments to Europe decrease radically.</p> <p>Information warfare, cyber attacks and increasing lack of trust.</p>

The background of the slide is a wall covered in a grid of surveillance cameras. The cameras are of various models and colors, including black, silver, and white. They are mounted on a light-colored brick wall. The text is centered on the wall, overlaid on the cameras.

China incorporates emissions-reducing features into its system of social credit to determine who and when people can buy e.g. flights, a car, fuel or meat. Personal carbon allowances are gradually introduced. China makes its system of social & climate credit an export product, which it uses to export surveillance capitalism internationally."

HOW DID THE WORLD BECOME DIVIDED?



Power games in a divided world

2019–2023

2024–2027

2028–2030



- China's economic growth continues and Belt & Road Initiative expands. China increases investments around the world. Chinese holdings in other countries increase and China starts to acquire media companies in target countries. Information warfare intensifies, leading to increased distrust between the West and the East.
- The digital silk road expands. China introduces its surveillance technology in other countries, especially in Africa and the Middle East. China's influence over these countries grows.
- China's internal conflicts and disputes with Hong Kong and Taiwan are resolved "in a manner that benefits China". The international community's attention is on other things and China's influence is so significant that no sanctions are imposed as a result of the breach of international agreements.
- Air pollution increasingly complicates people's lives in China. China makes large investments in renewable energy.
- India benefits from rising production costs in China and a substantial proportion of production shifts to India, where labor is cheaper than in China. The polarization of society continues as a result of economic growth and reforms.
- Trump is re-elected and the trade war continues, having a negative effect on economic growth in the USA in particular. In Europe and the USA, the economy stagnates and enters a recession.
- The development of renewables in China (solar and wind energy) continues. New energy storage technologies are created in China.
- China starts to react in the diminishing arable land. China shifts its eyes to the remote parts of Russia in the hope of gaining access to new farmland. Occasional conflicts emerge on the border between Russia and China.
- Russian censorship increases and things get more difficult for minorities. The detachment of the global Internet and firewalls get stronger.
- The EU is turbulent after Brexit. Several countries make various demands and threaten with leaving the EU. A common ground is not found easily. Countries establish direct bilateral trade relations with the USA, China and Africa.

Power games in a divided world

2019–2023

2024–2027

2028–2030



- Russia-based cyber attacks against several Western countries accelerate the world's division into blocs. EU and USA place strict sanctions on Russia, and technology is no longer exported from the West to Russia.
- China and Russia manage to settle their territorial disputes. China sells technology to Russia, Russia sells food to China.
- Interest in China's technologies increases in certain Eastern European countries. Hungary and Poland, for example, adopt Chinese surveillance technology.
- India gradually implements China's social credit system and it is used, among other things, to exclude certain parts of population from society.
- Russia and China try to influence elections in the USA and Europe ("Buying" politicians, some of whom get elected.)
- The impacts of climate change become more severe: extreme weather phenomena are more common, there is a shortage of arable land in China and citizens put pressure on the country's leadership. The popularity and influence of the green movement gets hold in China.
- China incorporates emissions-related features into its system of social credit: who can buy e.g. flights, a car, fuel, meat and so on, and when can they buy them? Personal carbon allowances are gradually introduced.
- As the European and U.S. economies stagnate, their bargaining power relative to China is reduced and China dictates the terms of trade. This leads to an increase in Chinese influence with respect to the EU and the United States as well.
- The democratic system of society appears very inefficient compared to China's decision-making. Democracy nevertheless maintains its hold in the Western countries, despite attempts to consolidate power among a smaller elite and heads of state also in Europe. State autonomy is restricted in the USA.
- Economic sanctions imposed on Russia have a negative impact on the entire European economy. In addition, unstable ageing democracies are unpopular targets for investments and even the investments of an ally, the United States, are not allocated to Europe.

Power games in a divided world

2019–2023

2024–2027

2028–2030



- China exports its system of social&climate credit to countries within its sphere of influence, which already use Chinese (surveillance) technology. Due to China's significant holdings in these countries, it can practically order them to implement the system. The system leads to greater inequality, as satisfying the system's requirements is not possible for everyone.
- China "owns" and guides decision-making in numerous countries through its investments and technology exports.
- The Asian Monetary Fund is established on China's initiative. The AMF also provides funding to other countries in Europe and South America who are in economic difficulties, leading to increased economic policy influence for China in these countries.
- China brands itself as the world's climate leader. There is some truth behind this branding: China has broadly implemented advanced renewable energy technology and efforts to reduce the citizens' emissions have been successful. At the same time, China uses climate action to control its own citizens and the citizens of countries in its sphere of influence and to advance its own interests.
- In the West, China's system of social&climate credit is seen as problematic in terms of human rights but, in practice, they don't have the power to do much about it. And, on the other hand, this brings the world closer to global emissions targets.
- Cooperation between Russia and China is deep. Russians use Chinese technology and the two countries have shared firewalls and troll farms. In practice, both Russia and China are behind Europe's digital eastern border. Tensions between Russia and Europe have grown.
- European economy is still not growing, so the USA focuses on the Latin American market. U.S. interest in the Latin American market leads to deeper Pan-American cooperation.
- USA tries to compete with China by reducing regulations concerning data and privacy protection. As Europe uses U.S. technology and services almost exclusively, the effects are also felt in Europe.

DATA SAVES AND ENSLAVES



SCENARIO 2: DATA SAVES AND ENSLAVES

Climate	Global movements call for climate action.
Technology	No regulation, rapid progress of AI and automation
Power	Fragmentation. AI in decision-making

Disillusionment in current global institutions to meet climate issues. Call for global action by citizens. Changes driven by individuals and consumers. Climate strikes and climate radicalism.

Global forums created and development towards AI and algorithm driven decision making.

Radical technological development and development of AI and automation reduces jobs across industries. Ethical issues remain unresolved.

Facing the world without paid jobs. Emergency of new data economy of the useless and the one-day work week.

Companies compete for people's personal data. Earning with personal data creates new data market. Opting out of digital devices becomes a luxury.

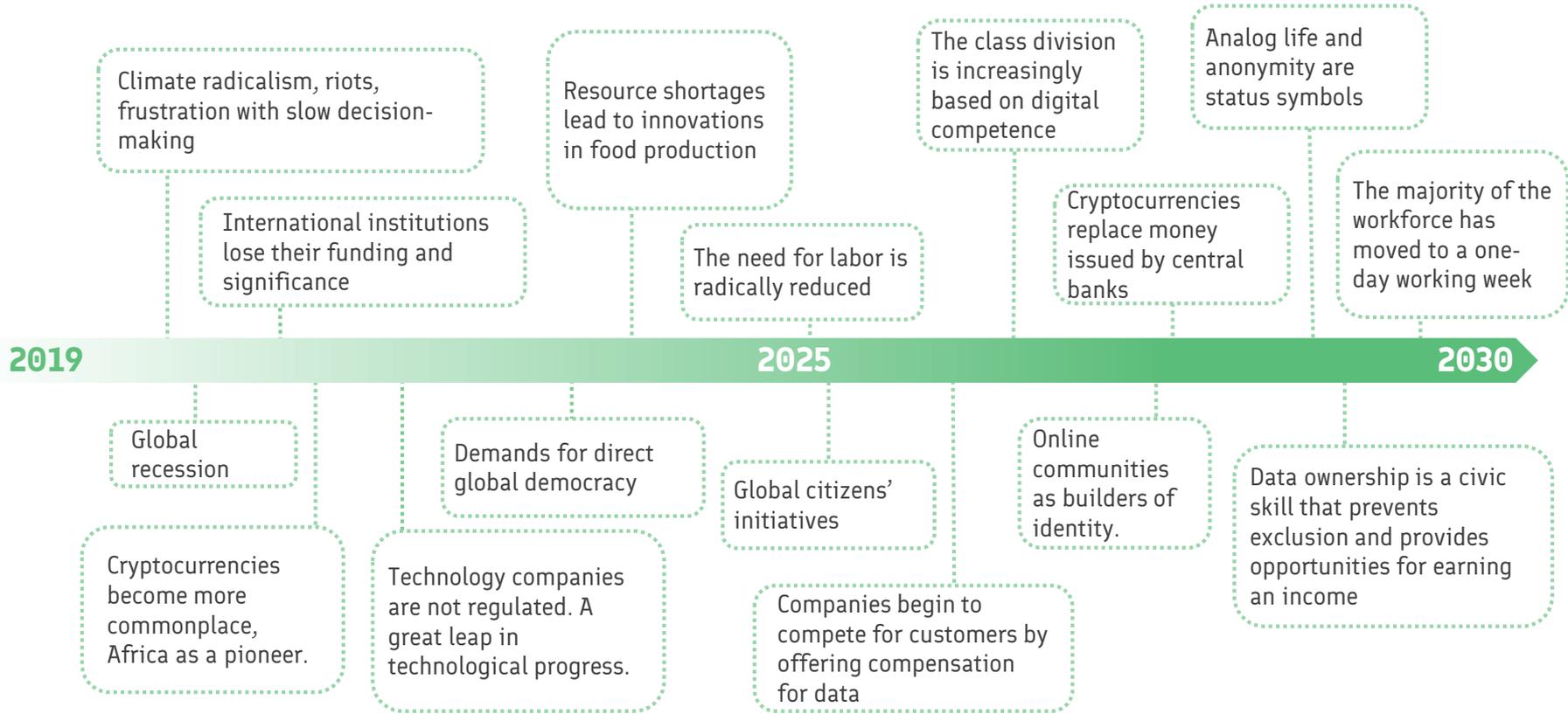
New social class division based on digital capabilities.

Cryptocurrencies replace money issued by central banks.

“Competition intensifies between companies regarding the use of personal data. People can price their data and earning an income by selling one’s personal data becomes possible. Ultimately, only few can afford anonymity and living an analog life.”



HOW DID WE END UP IN A RADICAL DATA ECONOMY?



Data saves and enslaves

2019–2023

2024–2027

2028–2030

- Climate strikes rise and criticism of slow decision-making grow louder across the world, particularly when it comes to climate issues. Climate radicalism among young people intensifies into riots around the world. Calls for a new way to vote globally on global problems starts to get ground.
- Brexit shakes the structures of Europe. The financial industry is shaken up as banks look for a new base after London. The uncertain economic climate and trade war lead to a global slowdown and recession.
- The powerlessness of institutions is realized and the multilateral system is eroded. International institutions such as the WTO, the IMF and the UN lose their funding and significance.
- As the power of nation states and international institutions weakens, the regulation of technology companies is weak and the ethical issues related to technological progress and AI, in particular, are given less attention.
- Radical development of AI and robotics: Advanced robotics reduce the need for labor steadily across the manufacturing and agriculture sectors.
- Cryptocurrencies grow in popularity as alternative investments. Various payment applications, such as Swish, are increasingly widely used. Facebook's Libra becomes a commonly used currency in the platform economy. The reliability of cryptocurrencies increases.
- Cryptocurrencies are first taken into widespread use in Africa, where trust in banks is low. The platform-based economy provides a more equal starting point for people in the developing world to earn an income.
- EU makes significant investments in food production innovations and regulations on food production are eased.
- Enthusiasm for self-tracking increases. The young digitally proficient data elite lives in a bubble. Individualistic and clan-oriented thinking leads to the emergence of strong societies online. Identity is shaped through these online groups.
- The weakening of national identity and the strengthening of global subculture identity.
- Consumption declines and the focus shifts to intangible consumption. The significance of eco-status strengthens.



SCENARIO 2

Data saves and enslaves

2019–2023

2024–2027

2028–2030



- The failure of climate agreements and climate actions leads to international institutions completely losing their significance and direct democracy becoming more popular.
- Global citizens' initiatives and direct digital democracy solutions become increasingly commonplace and more impactful. This presents a growing group of people with opportunities for exercising influence in areas such as climate decisions. A growing number of international and location-independent ideological movements emerge.
- Quantum computing develops rapidly and brings significant improvements to the use of data. Among other things, this enables public services to be automatically and efficiently targeted at the individual level. The individual's responsibility in society increases.
- Competition between companies for people's private data begins and people learn to put a price on their data. This creates the illusion of owning and controlling one's personal data. Pharmaceutical companies pay people for measurement data and Netflix pays viewers for monitoring data. Virtual business based on data increases.
- Individualization and personalized products become increasingly common and consumer power grows.
- Interest in cryptocurrencies increases among institutional investors. A financial crisis drives people to seek shelter in cryptocurrencies, which challenge currencies issued by central banks.
- The data economy has a polarizing effect. People with low incomes earn their income by generating data for corporations and only the wealthy can afford not to use social media services, for example. Analog life and anonymity become new status symbols.
- New food production methods are developed and optimization based on nutritional values increases as solutions to the food crisis are sought. Protein is partly produced using methods that conserve resources (bioreactors and protein out of air).
- Automation accelerates, self-driving vehicles and manufacturing robots are mainstreaming.

SCENARIO 2

Data saves and enslaves

2019–2023

2024–2027

2028–2030

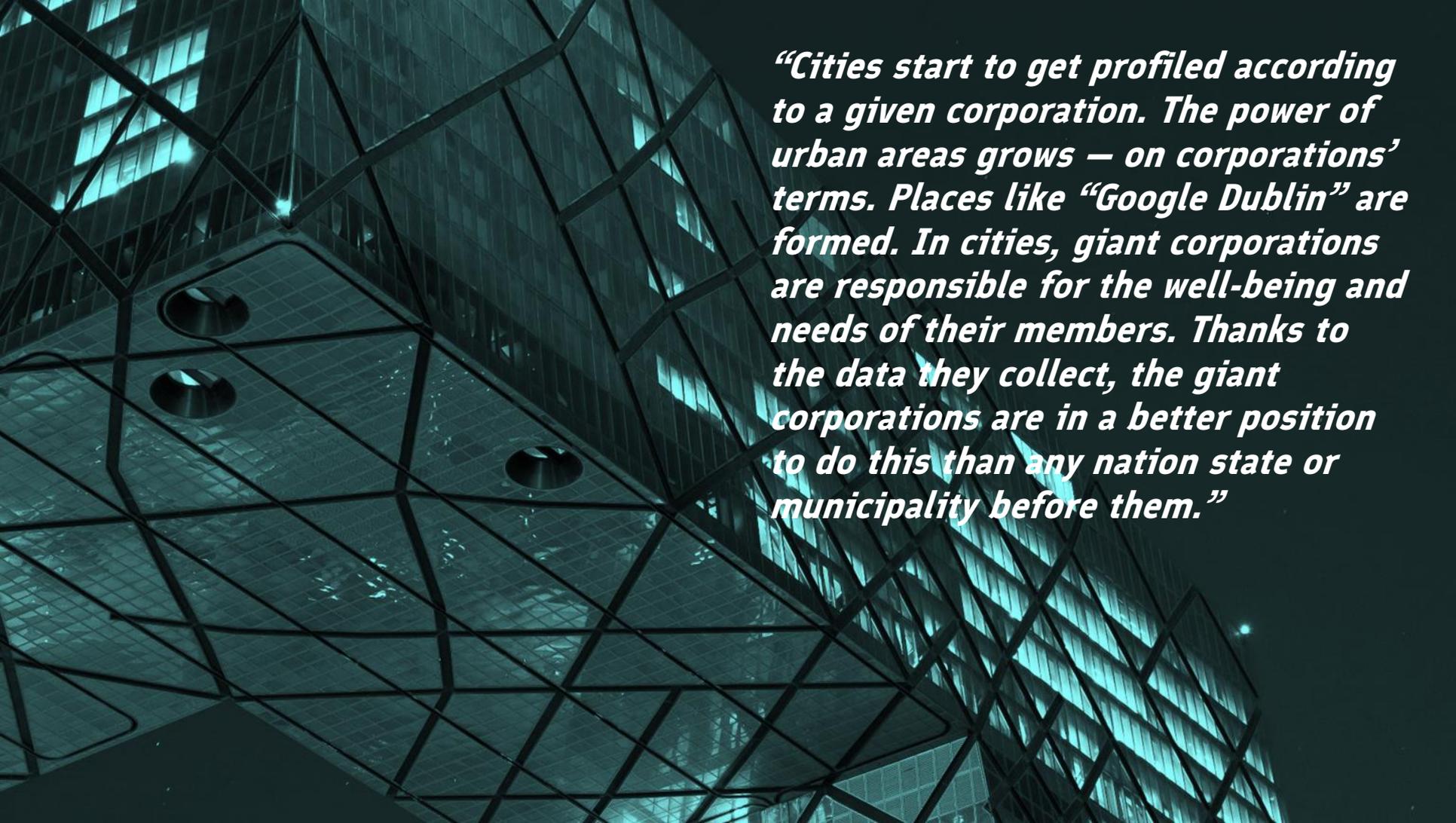


- Artificial intelligence is increasingly used in the evaluation and creation of citizens' initiatives. People realize that AI-assisted decisions are better than expected (legitimacy), but negative aspects also emerge. Ethical issues remain unresolved and the manipulation and falsification of data becomes more common as a means of influence (fake data).
- Political advocacy is further transformed to the direction where companies and politicians constantly try to influence the decision-making of individuals, only now with more powerful technology.
- Blockchain-based digital identity (and citizenship) is more used in digital transactions.
- The shift to a one-day work week occurs widely and people are haunted by the specter of uselessness. The significance of work as a factor that binds the individual to society diminishes.
- In the data economy of the useless, identity is shaped by the online groups one belongs to, for example. Value creation – and, as a result, earning an income – is no longer based on the production and consumption of goods as much as interaction and exchange between people.
- The opportunities in an extensively digitalized world include removing oneself from urban structures and living anywhere, irrespective of the place of employment, language or culture.
- Owning and managing one's data becomes a civic skill that is used to prevent exclusion from the data economy and provide everyone with the opportunity to earn an income.
- The people who are unable to take advantage of their own personal data for one reason or another are in the weakest position. Polarization depends more on competence and less on geographic factors. Digital rehab clinics and digital detox destinations grow in popularity.
- Robotics and AI solve challenges in healthcare.
- The resource-efficient optimization of food production is enabled by increased knowledge and transparency. New food production methods partially solve the problem of growing global demand for food.
- A shift from currency issued by central banks to a global cryptocurrency.

DIGITAL PATRONS OF A NEW AGE

SCENARIO 3: DIGITAL PATRONS OF A NEW AGE

Climate	Major corporations as global climate operators. Smart renewable energy.	<p>Responsible capitalism starts to take shape. Large corporations respond to the calls for sustainable business and strong self-regulation emerges.</p> <p>New cross-industry giants. The size of the corporations increase radically and corporations expand further into new industries.</p> <p>The role of nation states weakens as corporations take over duties that used to belong to nation states and municipalities.</p>
Technology	Technological progress and innovation is controlled by large corporations. No regulation.	<p>New kind of corporate cities emerge. Companies provide for members with basic services, like education, healthcare and housing.</p>
Power	Power is concentrated in increasingly large technology giants and urban areas.	<p>Regions and population polarize as members and non-members of corporations and new city states.</p> <p>Large investments and mergers between large corporations accelerate economies of scale. Revolutionary development in energy storage leads to larger electrification of society and towards free energy.</p>



“Cities start to get profiled according to a given corporation. The power of urban areas grows — on corporations’ terms. Places like “Google Dublin” are formed. In cities, giant corporations are responsible for the well-being and needs of their members. Thanks to the data they collect, the giant corporations are in a better position to do this than any nation state or municipality before them.”

HOW DID THE GIANTS TAKE OVER?

Increasing calls for responsibility among consumers and investors

Mergers between large corporations (such as Siemens and Google) – economies of scale and a leap forward in productivity

Cities become profiled according to corporations (“Google Dublin”)

Technology giants increase their credibility through strong self-regulation

Major corporations agree among themselves on strict climate regulation

A smart energy system and advanced energy storage

2019

2025

2030

Public sector indebtedness (the ageing of the population)

Technology giants aggressively expand into new industries

Companies take over the provision of services that used to be provided by the public sector

Preventive and effective actions driven by data

Nation states fail to find solutions to global problems

Nation states fail in the provision of public services, trust in political systems collapses

Giant corporations start to provide various services for their members under the principle of universal basic services, assume responsibility for the well-being of their members

The digital industry leaders of a new age

2019–2023

2024–2027

2028–2030



- The EU and the USA move towards increased market liberalism and deregulation.
- Consumers call for sustainable development and corporate responsibility and increasingly make choices accordingly. At the same time, social media increases pressure with regard to the transparency of operations. Financing sources also call for transparency and responsibility. Responsible companies are successful companies. Companies start to genuinely focus on responsibility.
- Large technology companies respond to the lack of trust they face by making their operations more ethical and transparent. The industry starts to engage in strong self-regulation to avoid tighter legislation.
- Solutions are needed to the major global challenges facing mankind, such as climate change, food availability, mass migration and the ageing of the population.
- Nation states fail to find solutions to global problems. No agreement is reached on climate, for example. Instead, nation states argue about who is responsible for reducing emissions.
- Public sector economies fall into debt to a substantial extent in many countries as the population ages. Social, health and pension costs rise and the size of the working age population decreases.
- Large global corporations recognize that the major global problems pose a threat to their operating environment in an unparalleled manner and start to create plans to solve these problems.
- Technology giants increasingly expand into new industries, such as healthcare (e.g. virtual healthcare assistants), education and logistics.
- Health and wellness industry further converges with the technology industry, particularly in the case of companies that manufacture sensors and chips. People's interest in self-care management increases.
- Technology giants make large investments in the development of renewable energy sources and energy storage solutions. The giant corporations recognize that the availability of clean energy is a precondition for their operations, technological progress and the electrification of society.

The digital industry leaders of a new age

2019–2023

2024–2027

2028–2030



- Collapsing confidence in the public-sector economies of European countries leads to higher interest rates on government bonds and deepening economic distress.
- The public sector fails in service production. The focus of politics is on acute economic problems and debt, and climate change and other major global problems are ignored.
- People's faith in political and national systems collapses.
- Regulations on corporations are eased in Europe and the United States. The activities of the competition authorities lose their significance when indebted nation states lack the resources needed for effective monitoring. Large technology companies create open platforms and global standards (data use, individual rights, the terms of commerce)
- Mergers of large corporations take place (such as Siemens and Google) as benefits of the combination of industrial and personal data are realized. A substantial leap in productivity is achieved and the significance of economies of scale rises to a new level.
- Following mergers between major corporations, energy storage solutions develop in great leaps, enabling the widespread use of wind and solar energy and the efficient

operation of small production units. This enables the extensive electrification of society. Electricity is produced to cover own needs for free and the surplus is sold to the network.

- Environmental data and environmental technology have a big impact on resource circulation and resource efficiency increases. At the same time, this period is characterized by a consumption hysteria enabled by new technologies and cheap energy.
- Corporations agree between themselves on climate regulation and decide that no-one should achieve an unfair competitive advantage at the climate's expense. Large corporations start taking climate action and refuse to cooperate with companies that are unwilling to commit to their targets.
- Companies increasingly take on duties that have traditionally belonged to national and local governments. The boundaries between sectors and industries disappear.
- Cities start to get profiled according to a given corporation. The power of urban areas grows — on corporations' terms. The Google bubble in Dublin grows stronger, and the influence of Microsoft increases in Paris.

The digital industry leaders of a new age

2019–2023

2024–2027

2028–2030



- Giant corporations start to provide services for their members under the principle of *universal basic services*. The services include healthcare and social services, education, childcare and even housing. This way, corporations ensure that they have customers and employees who have purchasing power and work power. At the same time, they are able to collect high-quality data.
- The population is divided between cities governed by giant corporations and rural areas whose inhabitants are not “members” of the giants. There are major differences in lifestyles and living conditions between cities and rural areas. The people living in rural areas also include nonconformists who have moved there to break away from the control of the technology giants.
- In cities, giant corporations are responsible for the well-being and needs of their members. Thanks to the data they collect, the giant corporations are in a better position to do this than any nation state or municipality before them. They know everything about their cities’ residents, from their health to their social relationships and lifestyles, which enables preventive measures of unparalleled effectiveness and allows them to control the lifestyles and behavior of their members through various incentives. Biohackers installing technology in their own bodies and transhumanism are part of everyday reality.
- The service levels provided by the giant corporations differ from one another. Some are closer to the Nordic welfare state with minor inequality, while others are liberal welfare states where “everyone is responsible for their own luck” and competition is intense. The giants differentiate themselves with their profiles and compete for the most talented people in various ways.
- Climate competition emerges (compare to tax competition). Educated young people want to live and work in carbon neutral cities and carbon neutrality becomes an increasingly important pull factor.
- Different technology giants control cities in different parts of the world. Attracted by the young workforce, the giant corporations also increase their presence in the African metropolises.
- As the significance of nation states declines, voting activity plummets and representative democracy reaches the end of its road.

FROM CRISES TO AGREEMENTS

SCENARIO 4: FROM CRISES TO AGREEMENTS

Climate	International institutions and agreements. Strict regulations and adapting to climate change.
Technology	Strict regulations and breaking up giant technology corporations.
Power	Power lies with international institutions.

Big crises are challenging a world order and drive for a need for international agreements and global climate policy steering methods.

Digital ethics gets ground.

Regulation of tech corporations is on the agenda and data policy is directed on global level. Democratic social contract society strengthens in Western world.

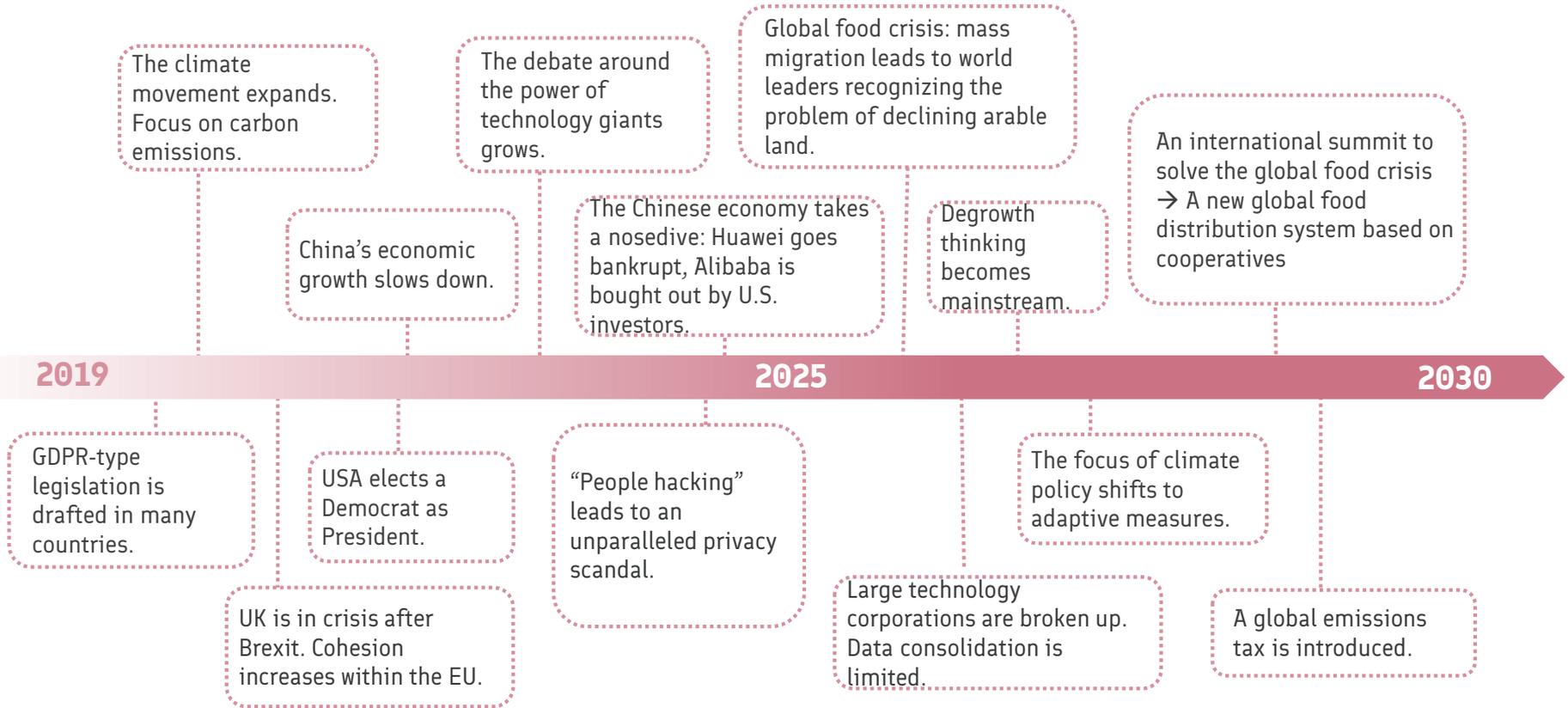
China loses its bargaining power globally as its economy slows and internal crises intensifies.

The strong interdependency of European Union leads to the federalist direction.

“It is revealed that data from devices that monitor health and well-being has been disclosed and physical reactions to various stimuli have been tested for the purpose of exerting influence. “People hacking” leads to an unparalleled scandal concerning privacy, which leads to demands for digital human rights and the breaking up of large technology companies.”



HOW WAS COMMON GROUND FOUND?



From crises to agreements

2019–2023

2024–2027

2028–2030



- **The climate movement continues to grow and its impact on politics increases.** The climate discussion focuses primarily on the reduction of CO₂ emissions and the state of ecosystems, for example, is largely ignored.
- Brexit leads to economic difficulties and unrest in the UK. The EU's cohesion and position are strengthened as a result of the mess. The leaders to take decisive action to defend the open society and to strengthen the world order based on liberal rules. **Sanctions are placed on Poland and Hungary to restore democracy.** The Nordic countries deepen their cooperation and national borders in the region lose some of their significance.
- The USA elects a Democrat president with more climate-friendly policies. The USA once again takes a big role in the activities of international institutions. **The public sector's role and impact increase.**
- **China's economic growth slows down and distorted economic figures lead to distrust regarding the functionality of the system.** China reduces its overseas investments, which leads to a decrease in its international significance. **India becomes increasingly attractive to the Western countries as an investment target and trade partner.**
- **Chinese companies lose out to their Western competitors in many respects** and lose market share in the Asian and African markets. Scandals related to privacy and surveillance become more common and boycotts among conscious consumers expand to cover a broad customer base.
- **In Asia and the United States, examples are seen of how the increase in personal data leads to responsibility shifting to individuals** (e.g. the differentiation of health insurance policies). There is a desire to put a stop to this development and, in Europe, a debate emerges on whether using personal data for this purpose should be allowed.
- **Inequality between people and societies is met with global resistance and the idea of the Nordic welfare state spreads around the world.** This is seen as one potential solution for "fixing capitalism".

From crises to agreements

2019–2023

2024–2027

2028–2030



- **Mass migration caused by a global food crisis leads to world leaders recognizing the problem of declining arable land.**
- **Awareness of climate change grows and climate influence among young adults becomes increasingly ambitious. Degrowth thinking becomes mainstream** and new “positive recession” indicators are developed. Young consumers, in particular, begin to favor experiences instead of physical goods and the values related to consumption change substantially. The emergence of eco-status.
- Pollution and the exhaustion of arable land cause concern in China. This also has an impact on the country’s economy, which no longer grows. The size of the workforce has decreased as the population ages and the country finds itself in an increasingly difficult predicament. Huawei goes bankrupt. The ownership of Alibaba becomes fragmented.
- **As climate change takes concrete form, the pressure to take adaptive action grows.** International agreements aim at global climate action, but also adapting society to changes, and focus is placed on building a more equal society.
- It is revealed that data from devices that monitor health and well-being has been disclosed and physical reactions to various stimuli have been tested for the purpose of exerting influence. The targeting of content based on such data becomes even more questionable than before. **“People hacking” leads to an unparalleled privacy scandal.**
- Close cooperation within the EU creates opportunities for the shift towards a federal state. **In Europe, there is a need and a wish to regulate people’s digital rights more strictly and comprehensively.**
- European political movements advocate for a supranational system that **would restrict tax competition and increase employee representation on boards of directors.**
- The European Commission issues regulations on the use of data possessed by insurance companies. The stricter Directives make it possible for everyone to have reasonably priced insurance.
- **The EU’s network also extends to countries such as Canada and Japan, and discussions on joining also include the possibility of limited membership by democratic countries in Africa and South America.**

From crises to agreements

2019–2023

2024–2027

2028–2030



- **The popularity of representative democracy and voting activity increase in Europe**, as the impact of representative democracy has improved and digital applications have made public governance more transparent. The EU introduces a digital platform that makes it easy to monitor the actions and effectiveness of political parties and representatives.
- **Food crises drive African metropolises into chaos.** Crisis management is also among the key objectives in the Middle East, India and the EU.
- **An international summit is organized to solve the global food crisis. The new global food distribution system is based on shared power and cooperatives.** Extensive international agreements are signed. Also party to these agreements is China, which finds itself in a difficult spot in the global economy and is motivated by avoiding the effects of the food crisis. Europe's primary interest is avoiding mass migration. The USA's concerns are related to preventing economic instability.
- **The power of large corporations is restricted** by aggressively breaking up the market and preventing the consolidation of data (Facebook is forced to sell WhatsApp). The data and privacy crisis leads to the introduction of GDPR-type legislation in several countries.
- **India develops rapidly towards a wealthy democratic society that plays by the rules of international trade and the country becomes Europe's largest trading partner.**
- **Supranational stakeholder groups are established, leading to unanimity about reforming the decision-making of key international institutions** to correspond to the changing balance of the world and strengthen global governance. India and African countries assume an increasingly important role.
- **Global climate agreements with a major regulatory impact and CO₂ taxes are widely implemented.** Societies must change radically as technology does not provide a solution for the sustainable reduction of emissions arising from production and transport. Travel and consumption are subject to strict regulation.
- **The EU's shift towards a federal state** grows stronger and ultimately key decision-making power is transferred entirely from the member states to the EU.
- **The idea of a universal basic income receives support.**
- **Thanks to shared rules and a predictable operating environment, the economy grows – albeit slowly – towards 2030.** However, GDP as a performance indicator has been superseded by an index of human and climate well-being.

IMPLICATIONS OF SCENARIOS ON FINLAND'S COMPETITIVENESS

Part 3

SCENARIO IMPLICATIONS FOR FINLAND

Power games in a divided world

POWER GAMES IN A DIVIDED WORLD – FINLAND BETWEEN GLOBAL SUPERPOWERS

The opportunities of a small country to influence the terms of trade decrease under pressure from global superpowers and there is increased pressure to choose a side.

Finland has the ability and opportunities to operate between two superpowers and to engage in trade with both sides. Nevertheless, a constant risk of new sanctions looms in the business environment, and operating conditions are extremely insecure.

Companies whose products enjoy high demand in the Asian markets are most likely to succeed. Demand focuses especially on innovations related to renewable energy and the bioeconomy.

POLITICAL CLIMATE

Finland is also seeing a rise in nationalism, and attitudes towards the EU and international cooperation have become more negative. **The political climate in Finland is tense.** The nation is divided on Finland's role and position: can we navigate between two world orders or should we place greater emphasis on European values (such

as human rights and freedom of speech) and refrain from cooperating with parties that violate these?

REGULATORY ENVIRONMENT

The EU's internal market stagnates, and Finnish exports are increasingly focused on Asia. **China imposes strict climate sanctions on its trade partners.** The social and climate credit system harnessed to promote climate monitoring, in which the individual is the biggest payer, spreads not only in China, but also to other trade areas. As a result, Finnish companies are also required to allocate emissions per time of use per product.

China's different copyright system and higher demands concerning the transfer of foreign technology and data pose challenges to Finnish companies operating in China and companies that source products from the Chinese market.

NATURAL RESOURCES

The strategic significance of waterways and arable land to the superpowers is emphasized and the prices of the related raw materials increase. This ultimately helps balance the Finnish economy.

LABOR MARKET

Traditional labor market organizations maintain their position on the labor market.

The main counterforces are a stream of workers coming from China and Asia and the growth of the grey economy.

INTEREST GROUPS

The status and activities of interest groups are influenced by the export markets in different sectors. Pressure to internationalize lobbying, for example in the energy sector, increases.

CAPITAL

Plenty of capital and risk financing is available in the Asian markets. In the West, interest rates and share prices trail those in the East, pushing European money to seek diverse investments. **In the context of the Silk Road initiative, Finland has invested in infrastructure and 5G/6G projects.**

COMPETENCE

Finland invests in cybersecurity competence, which is seeing increasing demand around the world.

SCENARIO IMPLICATIONS FOR FINLAND

Data saves and enslaves

DATA SAVES AND ENSLAVES – THE POWER OF THE STATE AND TRADITIONAL INSTITUTIONS WANES ALSO IN FINLAND

Similar to other countries, Finland suffers from the monetary and financial crisis spreading from Europe at the beginning of the decade.

High-quality data give Finland a competitive edge in the radical data economy (e.g. health data, data collected over long periods of time).

POLITICAL CLIMATE

The importance of traditional parties has declined. Change is sought through single-issue popular movements, which operate digitally, independent of location. Methods of direct democracy enabled by new technologies are in use. Artificial intelligence is widely employed in legislative drafting and decision-making.

REGULATORY ENVIRONMENT

National and international regulation decreases substantially. Companies are under constant evaluation and review on social media and other platforms used by individuals. **Movements, strikes and boycotts spread rapidly.**

NATURAL RESOURCES

Increasing data volumes enable the location of recyclable materials to be pinpointed with ever greater accuracy. Finland sees a breakthrough

of sharing economy platforms in the daily life of consumers. Adoption of circular economy innovations increases also in the business operations of service companies and industrial operators.

LABOR MARKET

Entrepreneurial activity in the job market increases as people earn an income by making use of their personal data. Societal concepts and structures related to work and unemployment have been revised.

As the significance of work decreases, the role of the job markets and labor costs in companies' location decisions also declines.

Finland can compete on high-quality data and a favorable climate from the perspective of climate change. The cleanness and price of energy are also increasingly important factors in location decisions.

The continued development of VR technology and decrease in working hours increase the popularity of homes in sparsely populated areas.

INTEREST GROUPS

Labor market organizations lose their importance, as people turn to global platforms in search of support for the transformation of work. Organizations find new roles providing

education for the data economy and (mini) entrepreneurship.

Lobbies disappear in many sectors, as the sectoral division is redefined.

CAPITAL

Global crowdfunding projects have taken on a clearly more significant role in the capital markets. Cryptocurrency has also become something of a replacement for share issue (in platform economy companies). Funding is readily available for new technologies, while traditional industrial sectors have difficulties securing funding due to their insecure outlook. **The European financial crisis affects Finland** as major long-standing Nordic banks go bankrupt.

COMPETENCE

As elsewhere, digital competence grows increasingly important in Finland and the goal is to provide everyone with the basic skills needed to function in the data economy. **Learning content related to data ownership, data management and artificial intelligence is added to the national core curriculum.**

SCENARIO IMPLICATIONS FOR FINLAND

Digital patrons of a new era

DIGITAL PATRONS OF A NEW AGE – A SHIFT IN THE OWNERSHIP OF FINNISH COMPANIES

The ownership of Finnish companies gradually shifts to major foreign investors and corporations. Small companies and startups are quickly bought out, which affects Finland's business and innovation policy.

The public sector's problems providing services to Finland's aging population increases the demand for interventions by private companies.

The role of the public administration as a service provider declines when giant corporations bring their own healthcare and education systems with them. Independent academic research declines.

POLITICAL CLIMATE

The Finnish Parliament turns into a pseudo-institution, as multinational giants engage in self-regulation and introduce their own operating methods and regulation, ignoring state borders.

Finland gives the green light to radical tax cuts to attract giant corporations to operate in Finland. Income gaps and productivity increase.

Many benefit from the services provided by giant corporations, others are dissatisfied and cynical. Moreover, many Finns doubt their ability to influence matters, at least through politics.

REGULATORY ENVIRONMENT

Giant corporations gradually introduce their legislation, regulations and standards into the network of subcontractors. As a result, the regulations with the greatest impact on the Finnish business sector come from outside the realm of democratic decision-making.

LABOR MARKET

The labor market has become polarized, and Finns face increasingly tough competition in the job market. The work communities of giant corporations are global. AI translation has broken down language barriers. One's employer is more important than one's profession in the job market, and the unionization of workforce is also organization based.

INTEREST GROUPS

The influence of the traditional labor market parties declines and there is a shift towards international unions divided according to giant corporations.

The status of lobbies changes, as the field becomes more international, the ownership of Finnish businesses moves abroad, and heavy consolidation affects many sectors.

NATURAL RESOURCES

Energy-technology innovations offer an opportunity to Finland. The battery industry cluster is thriving, and the recycling and seabed extraction of battery minerals are growing fields of business.

CAPITAL

Giant corporations also finance Finnish companies and ultimately many promising companies merge with giants. This is a great challenge to the government's innovation funding. There is a need for financing instruments suited to a model in which startups and small companies are quickly bought up.

COMPETENCE

In the job market, increasingly unscrupulous methods are used to attract highly competent professionals. **The availability of a competent workforce is one of the only ways that Finland can attract large corporations to the country.** Meanwhile, Finland faces challenges from the brain drain resulting from the global job market, further enhanced by the education provided by large corporations.

The assessment and reorganization of the education and research system becomes a topical issue.

SCENARIO IMPLICATIONS FOR FINLAND

From crises to agreements

FROM CRISES TO AGREEMENTS – BEING A MODEL CITIZEN HAS ITS BENEFITS, BOTH FOR FINLAND AND THE UNION

The crises shaking the world also have repercussions on Finland. Ecological crises bring large-scale migration to Europe and Finland. This leads to challenges related to integration but also alleviates the labor shortage that Finland suffers from.

Reforms move social security towards universal basic income.

By 2030, the EU's internal market and cooperation have grown stronger, creating opportunities for Finnish companies pursuing internationalization.

Economic and political governance change to support the shift to a low-carbon society.

POLITICAL CLIMATE

The political atmosphere has calmed by the end of the decade. Voter turnout in the elections to the European Parliament has risen radically. Anti-EU movements operate as a counterforce to liberal global movements, but most Finns feel very positive about the EU.

The increasing shift of power to the EU changes the role of regional policy. The emphasis on urban

development causes friction between cities and rural environments.

REGULATORY ENVIRONMENT

The federalization of the EU moves decision-making concerning trade and industry further away. Especially regulation regarding resource- and energy-efficiency becomes stricter, and regulation is carried out at the EU level.

Ethical data use practices spread and are largely applicable in various industries in Finland. Transparent and safe data use creates opportunities for Finnish healthcare companies, among others, which can now employ the extensive Finnish health data library.

NATURAL RESOURCES

The regulation of forest use has major effects on the Finnish forest industry, which shifts towards a circular industry approach that combines forest resources and the concept of the circular economy.

LABOR MARKET

Labor market organizations become increasingly international. Discussions can be conducted at a European level and in some cases even globally. Growth is registered in the Finnish working age population, and the role of

employment-oriented integration increases.

INTEREST GROUPS

Lobbies focus their activities increasingly on Europe and international institutions.

CAPITAL

National innovation and research funding is shifted to the EU, which has a direct impact on these activities in Finland. Most of the funding is allocated to solving the problems brought about by climate change and the number of long-term strategic projects increase.

COMPETENCE

Responsible management and use of data as well as collaboration and negotiation competence receive greater emphasis as workplace skills.

Observation skills become more important, as individual opportunities to influence are minor. Scientific and research cooperation thrives. The number of cooperation projects has increased radically, and cooperation is also vital to Finnish universities.

Low-carbon circular economy becomes a subject taught at schools.

SCENARIO IMPLICATIONS FOR KEY INDUSTRIES

Part 4

SCENARIO IMPLICATIONS FOR KEY INDUSTRIES

Power games in a divided world

**BIOECONOMY AND CIRCULAR ECONOMY**

China has an effective leadership position with respect to tightening emission limits and investments. China is a significant owner of raw materials in Africa, for example.

The circular economy and raw material flows and the boundaries between blocs guide production location decisions. Location is polarized either near raw materials and circular economy hubs or customers and logistics hubs. China guides the implementation of the circular economy in a centralized manner. Implementation elsewhere is slower and more regulation-driven.

The symbiosis between megacities and industrial circular economy hubs leads to scalable and duplicable giant investments. Small companies fall by the wayside.

Forests and waterways emerge as the focus of strategic geopolitics. The blocs need to ensure access to critical natural resources in the future.

**ENERGY AND CLEANTECH**

China and the USA move in different directions when it comes to climate policy. China emerges as a superpower of cleantech, renewable energy and smart energy networks, while the USA falls behind in technological development, eases climate regulations and extends its support for fossil energy.

The climate policy of a weak EU loses its effectiveness and there are growing regional differences in the forms of energy production.

The energy decisions of EU countries are linked to the bloc that each country identifies with. Some EU countries reach towards the USA and harmonize their climate regulations and

energy systems with the USA to maintain trade relations. Some Eastern European countries enter into an energy partnership with China, receive generous subsidies, adopt Chinese technology and join China's supergrid.

The intelligence of energy networks increases and espionage and cyber sabotage related to energy networks increases between the blocs.

**HEALTH AND WELLBEING**

Europe falls behind in development in the field of health and wellness technology. The stagnant European economy does not have sufficient capital for pharmaceutical development, and companies move to Asia.

China's social credit system awards people points for health-related activities. China is able to collect detailed health data on its citizens and influence their behavior. **China has an advantage in the use of AI and data** and the country takes major leaps in the field of health technology.

Many countries adopt a personal health and wellness budget that takes into account nutrition, exercise and other lifestyle factors affecting health. Citizens receive tax breaks for the desired behavior and, when people get sick, the price of treatment is lower for those who have verifiably followed a healthy lifestyle. Insurance companies collect increasingly accurate health data on their customers and price their services accordingly. Inequality increases.

**CONSUMER BUSINESS AND TOURISM**

Products and services are increasingly designed to suit Asian preferences, as that region has the largest potential customer base.

China and Asian countries maintain their position as leading travel destinations. China uses political measures to control the destination choices of travelers, creating increased pressure on the destination countries to please China and not take action to address human rights issues, for example. China also strengthens its own business activities in travel destinations. With regard to foreign travelers visiting China, China takes advantage of its visa practices to collect data.

Travel becomes a possibility only for a small group of privileged people. Surveillance technology is used to regulate travel and consumption, especially in Asia.

**DIGITALITY**

Intellectual property rights are ineffective across blocs, forcing companies to choose their markets and ecosystems based on the blocs. Internal standards emerge within blocs.

China and Russia engage in digital cooperation and have open interfaces between them. Russia adopts Chinese technology.

Security threats intensify due to the stronger connection between the countries and the roll-out of 5G technology. Russia and China also cooperate in the area of cyber attacks and information warfare.

China launches a renminbi-based cryptocurrency, which is adopted not only in China but also in many African countries. With its mobile payment practices, Africa is fertile ground for growth.

Chinese surveillance technology spreads in African countries, and some Eastern European countries also adopt it.

China's success creates pressure to deregulate technological development and the use of data in the West.

SCENARIO IMPLICATIONS FOR KEY INDUSTRIES

Data saves and enslaves

**BIOECONOMY AND CIRCULAR ECONOMY**

Consumer and investor pressure boost the competitiveness of the bio and circular economy. Product manufacture becomes more transparent. Platforms and data provide information on the location of recyclable materials.

Data enable negative aspects such as environmental nuisance to be considered in product prices. The accurate real-time measurement of carbon sinks becomes possible, affecting the use of forests as raw material.

Few people can afford to eat real meat or fish, and **artificially produced food constitutes most of the diet for the middle class.** A focus on local production emerges and urban farming, backyard production and local food are the prevailing trends.

**ENERGY AND CLEANTECH**

Affordable technology gives a growing number of consumers the opportunity to produce energy themselves, and conflicts increase between consumer-producers and traditional energy companies. Energy is linked to identity policy. **The shift to a self-sufficiency economy sees the establishment of local energy rings and energy cooperatives.** Self-determination concerning data becomes a prominent concept in service marketing.

States lose their hold on the energy infrastructure, and the development of energy transmission and delivery networks is left to the industrial sector. Heavy industry relocates in pursuit of the cheapest energy and most functional networks. Protecting networks from cyber attacks is a key issue for industry.

Mobility as a service sees explosive growth. The elite use their own bicycles and low-emission vehicles to facilitate their mobility outside the data network. The masses, in turn, use digital mobility services offered by large service providers. As the public administration becomes weaker, the maintenance and development of logistics infrastructure becomes a global problem.

**HEALTH AND WELLBEING**

The use of AI and robotics in healthcare develops by great leaps and becomes increasingly commonplace.

Individuals control and manage their own health data and they can decide what is measured and what the data is used for.

Paying for health data increases the amount of data but, at the same time, concerns arise about the quality of data.

The individual's responsibility is highlighted when technology and measurement become available for those who want and can afford it but are not mandatory. Insurance companies offer benefits to people with healthy lifestyles. Healthcare is personalized.

Nutrition and medication can be optimized at the individual level, and increasingly common 3D printing challenges medical regulation. Growth in platform-based business models based on personalization.

**CONSUMER BUSINESS AND TOURISM**

Individualization and personalized products become increasingly common and consumer power grows. Data is used as an instrument of exchange and to acquire services and products.

Sharing economy platforms make a breakthrough in the daily life of consumers.

New food production technologies are developed rapidly. Data is used extensively to optimize food production and efforts to reduce food waste are successful. Customized and personalized diets become increasingly common.

Retailers become an unnecessary intermediary between food and the consumer. Food is automatically delivered to the doorstep based on data disclosed by users.

Made to order operating models emerge, for example in clothes manufacture, reducing the disposal of finished products.

The share of independent travelers grows. Virtual travel

increases, replacing physical travel to a certain extent. The distribution of income is imbalanced. People have more free time globally but purchasing power declines.

**DIGITALITY**

The MyData movement gathers strength. A data exchange emerges when the value of data is recognized in various business environments and it becomes possible to trade data under the same logic as the stock markets. **Individuals decide to whom, and for what use, they sell their data. Data brokers act as intermediaries.**

The ethical nature of technological development is not monitored. **Personalization, fragmentation and tribalization lead to the emergence of mini-markets where even small operators can thrive. The significance of blockchain technologies increases** and they are widely used in contexts where third-party verification is necessary.

Many cities introduce advanced sensor technology, which enables infrastructure costs to be allocated at the individual level, for example.

Multiple cryptocurrencies are in widespread use. In an individualized and tribalized culture, currency is one way of expressing one's identity. Companies may offer their services only in one currency and thereby practically exclude certain groups from their customer base. The shift to cryptocurrencies also increases the risk of cyber attacks at the individual level.

SCENARIO IMPLICATIONS FOR KEY INDUSTRIES

Digital patrons of a new era

**BIOECONOMY AND CIRCULAR ECONOMY**

The technology giants invest significant amounts of money in renewable energy, the bioeconomy and the circular economy. Methods for Carbon capture and storage and the reuse of carbon as material develop and become more common. Protein starts to be produced from thin air with the help of inexpensive energy, especially in sunny regions.

Raw material ownership lies with large corporations and power with large investors. The data of large corporations are used to optimize the circular economy.

Big industry as well as smaller operators and communities have local raw material cycles.

Companies have a strong interest in protecting the soil and groundwater. Cultivation solutions that conserve water and the soil quickly become dominant in the field.

**ENERGY AND CLEANTECH**

The share of renewable energy grows quickly to meet the needs of large global corporations. Traditional energy companies experience difficulties as major corporations expand their operations into energy production. Small energy companies go bankrupt or get bought out. **Energy storage solutions develop extremely fast** due to strong demand.

Corporation-led voluntary environmental regulation expands as pressure from consumers and financing providers increases.

Society's infrastructure, such as energy networks, groundwater reserves, water distribution and roads end up in the ownership of large corporations. Access to basic commodities outside the areas controlled by corporations becomes significantly more difficult, and the price of water increases.

There is a growing demand for clean industry solutions. Individual solutions spread rapidly into global use through the value chains of large corporations. **The funding of innovation is dependent on the development programs of large corporations.**

**HEALTH AND WELLBEING**

Giant corporations increasingly shift to the health business.

Giant corporations develop their own health services, acquire companies in the health and wellness sector and establish their own hospitals.

Drone deliveries of products such as medicines, blood samples and tissue becomes increasingly common both in cities and in rural areas. This promotes the availability of medicines in remote areas, for example.

Large corporations provide healthcare and education services. They also obtain high-quality data in connection with producing services. Thanks to data, large corporations can engage in preventive activities of unparalleled effectiveness. This also ensures the high functional capacity of their customers and employees.

The capital-intensive nature of pharmaceutical development favors large corporations. This is particularly evident in the field of gene therapy, which develops rapidly thanks to the capital invested by large corporations.

**CONSUMER BUSINESS AND TOURISM**

Consumer demands regarding sustainability and corporate responsibility increase. Self-regulation by technology companies restores consumer trust. Large technology companies create open platforms and global standards.

Consumption models change as everything happens in hubs

controlled by large corporations. **Technology companies expand their service to many fields and the boundaries between industries and sectors disappear.** Most services can be acquired from the same provider, which makes life more convenient for many people but, at the same time, monopolization restricts the number of available alternatives.

Climate-friendly consumption becomes easy and effortless as consumers can trust that the services provided by giant corporations are climate-friendly.

Tencent strengthens its position in the travel business in China and in travel destinations favored by Chinese people.

**DIGITALITY**

With all industries going digital tech giants have comparative advantage to operate in most industries.

Technology giants that develop into powerful conglomerates provide their customers with nearly all the services they need. **This leads to people being divided into groups of members of different technology giants.**

The giants continue to make major investments in individual cities, and cities subsequently "specialize" according to technology giants. **People begin to identify as Google and Amazon people for example.**

Technological development and data are controlled by the giants. Small companies and application providers are quickly bought out.

People's interest in self-tracking and analysis grows and attitudes towards new technologies are favorable. Even transhumanistic biohacking and self-improvement through technology is an emerging trend.

SCENARIO IMPLICATIONS FOR KEY INDUSTRIES

From crises to agreements

**BIOECONOMY AND CIRCULAR ECONOMY**

Widespread SDG implementation is seen in companies because of international regulation as well as pressure from shareholders, investors and citizens.

International institutions assume an increasingly important role in the distribution of raw materials. Conflicts emerge between the mitigation of climate change and the industrial use of natural resources (e.g. certification processes and a prohibition against the complete harvesting of forests).

The food crisis leads to the end of cotton production as resources are reallocated to food production. Urban food production increases and diets change, following the introduction of environmental taxes on, for example, meat consumption.

Clean water emerges as a strategic natural resource and an advantage in negotiations.

Strict environmental and data regulations leads to slow decision-making and a recession in the economy. Degrowth lifestyles make necessity a virtue.

**ENERGY AND CLEANTECH**

Owing to strict regulation, **the development of energy and environmental technology is slow but steady.**

Emission reduction measures and technological development are guided by increasing climate and environmental taxation as well as strict and ambitious political emission reduction targets. **Regulation leads to inefficient and partially optimized markets, but on the other hand creates demand for solutions involving smart energy technology, low-carbon industrial products, energy storage and low-emission traffic as**

well as synthetic fuels. A genuine market also emerges for industrial water consumption solutions.

Strong public innovation funding maintains the European industry's capacity for renewal.

**HEALTH AND WELLBEING**

The emphasis on responsibility gives Europe a competitive edge. This attracts talent and investment to Europe.

Regulation increases confidence in the disclosure of health data. Thanks to this, the data available in Europe is of higher quality than in other regions. Europe creates a harmonized data policy that enables the secure cross-border transfer of health data. The EU establishes a shared databank.

The European Commission introduces stricter regulations on the use of data in the insurance industry with the aim of reducing the shift of responsibility to the individual and preventing insurance prices from spiraling to levels that people in risk groups cannot afford.

The role of the public sector and regulation in healthcare increases in several countries. Impact-based healthcare is introduced in many countries with an aging population.

**CONSUMER BUSINESS AND TOURISM**

Regulation guides consumption habits and sustainable consumption becomes mainstream. Crises have made many people accept a change in lifestyles and living standards.

Growth in the popularity of local services and locally produced commodities.

Pigouvian taxes (including a global carbon tax) guide

consumption away from products that are harmful to the climate. Ethics and production conditions receive more attention than before, and operators perceived as unethical are widely boycotted. **Ecological features become status symbols,** and young consumers begin to favor experiences instead of physical goods.

The sustained zero growth of the economy supports the trend of local tourism. Following regulation, **air travel declines, and growth is seen in overland travel.**

**DIGITALITY**

Technological development and the use of data are regulated based on ethical criteria. Consensus on the importance of regulation has emerged following data leak scandals. **Restrictions on the use of personal data are introduced regarding insurance decisions, for example.**

The technology giants are broken up, creating opportunities for smaller operators and enabling new kinds of innovation. Regulation has created a more level playing field but also slowed down technological development.

The transparency of political decision-making increases in democratic countries following **the invention of new forms of digital democracy.** This leads to growing interest in political decision-making and higher voting activity in democratic countries.

Technological progress is not fast enough to make it possible to solve the climate crisis by technological means.

The significance of digital ecology increases when there are no longer enough resources for all of the services of the digitalized world (digital carbon footprint).

HOW TO USE SCENARIOS?

Attachment 1

SCENARIOS AS A TOOL

Business Finland Scenarios can provide a starting point and reference scenario for industry or theme specific scenarios which can be tailored based on the users specific interests.

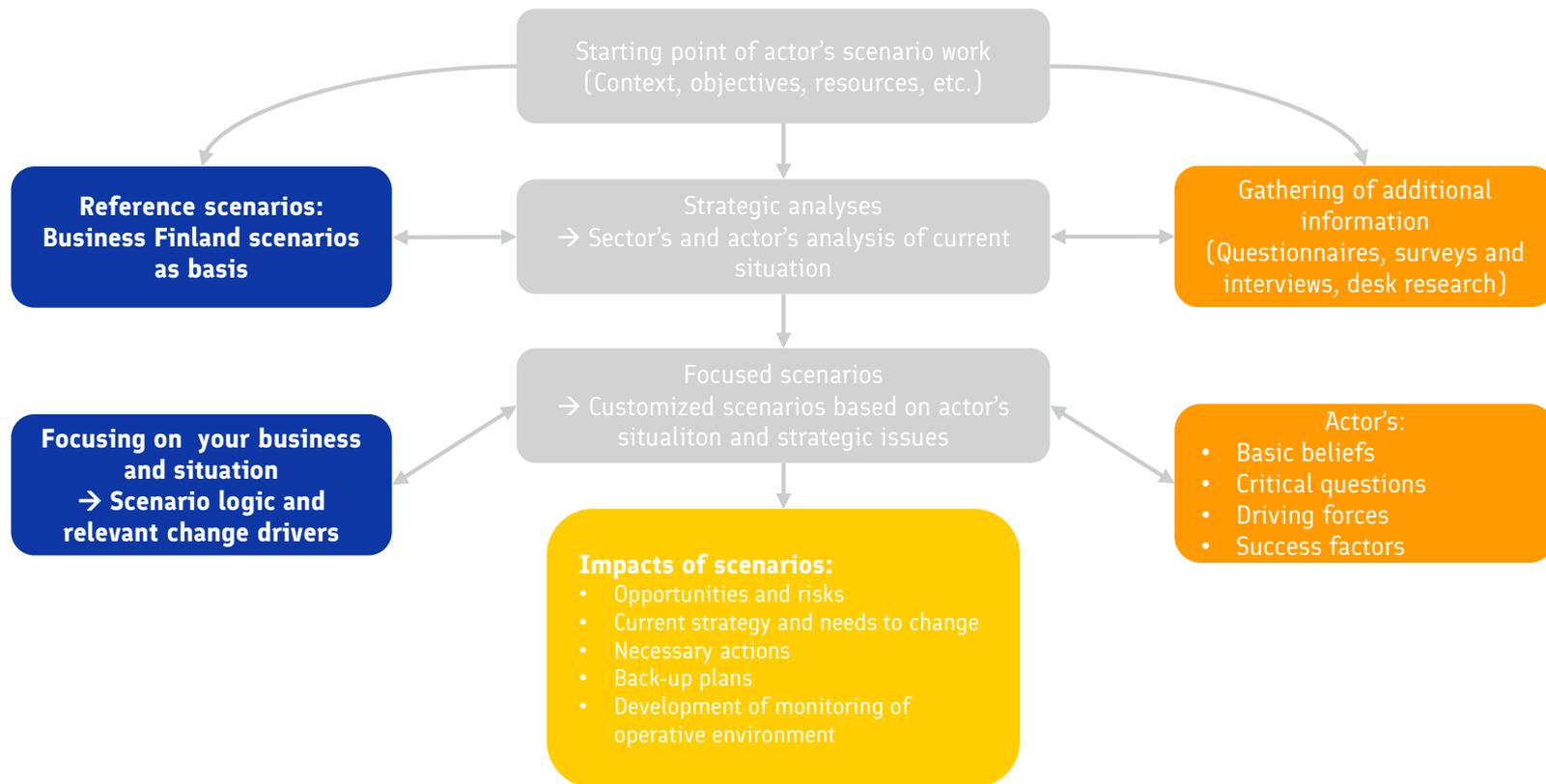
Scenarios can be utilized to support:

- Strategy development
- Preparing back-up plans
- Identification of strategic risks and opportunities
- Supporting strategic leadership
- Supporting monitoring operating environment

The framework in the next slide describes how any company or organization can create more focused scenarios from the base of reference scenarios.

UTILIZING SCENARIOS

How to tailor the scenarios to respond my own industry/company?



CHANGE DRIVERS AND UNCERTAINTIES

Attachment 2

Climate change and the state of the nature

- ❖ **Extreme weather phenomena and natural disasters**
(incl. heavy rainfall, hurricanes, tornadoes, extreme heat, forest fires, the development of infrastructure)
- ❖ **Glaciers and the sea level rise**
- ❖ **Disappearance of biodiversity**
(incl. the operations of ecosystems, running out of soil)
- ❖ **Global food crisis**
- ❖ **Climate refugees**
- ❖ **Climate and environmental policies**
(incl. the emissions and regulating of traffic and telecommunications)
- ❖ **Something else, what?**



Geopolitics and the development of geographical areas

- ❖ **Protectionism and the future of free trade** (incl. a trade war between USA and China)
- ❖ **Great power relations and the emergence of blocs** (incl. international conflicts)
- ❖ **Development of Africa** (incl. international investments)
- ❖ **Development of China** (incl. a demographical change, infrastructure projects, such as the Belt and Road Initiative, Made in China 2025)
- ❖ **Development of the Middle East**
- ❖ **The arctic area** (incl. the opening of the Northeast Passage)
- ❖ **Migration**
- ❖ **Something else, what?**



The global economy and the financial system

- ❖ **The focus of the global economy**
(incl. the rise of China and redistribution of markets)
- ❖ **Internal economic development in Asia** (incl. India)
- ❖ **Development of international production**
(incl. decentralized production, the role of GDP)
- ❖ **Increasing income gaps and inequality**
- ❖ **States running into debts**
- ❖ **Sustainability of the financial system**
(incl. steering from central banks)
- ❖ **The future of currencies** (incl. cryptocurrencies)
- ❖ **Public sector funding**
(incl. taxation of the platform economy)
- ❖ **Something else, what?**



International institutions and agreements

- ❖ **International agreements** (the role and status of international institutions)
- ❖ **The development and status of the EU** (incl. Brexit, functionality of the internal market)
- ❖ **The future of democracy and the principle of a constitutional state** (incl. the development of authoritarian states)
- ❖ **New institutions and organization**
- ❖ **The level and scope of corruption**
- ❖ **The future of democracy and the principle of a constitutional state** (incl. the development of authoritarian states)
- ❖ **Something else, what?**



Technological development

- ❖ **The electrification of society**
(incl. traffic and logistics)
- ❖ **Energy production and storage**
- ❖ **AI development** (incl. regulating and ethics, singularity)
- ❖ **The future of data transfer and processing**
(incl. quantum computers, big data, block chains)
- ❖ **Servicification and digital platforms**
- ❖ **Innovation activities** (incl. patents)
- ❖ **The automation of work** (incl. the productivity of work, need for workforce, the transformation of education and skills)
- ❖ **Something else, what?**



Data ownership, openness and trust

- ❖ **Big techs: Role and influence**
(incl. the centralization and ownership of data, GAFAA regulations)
- ❖ **National technology restrictions and regulations** (incl. technology exports, standards)
- ❖ **The future of the global Internet**
- ❖ **The ownership and use of personal data**
(incl. the regulation of personal data, MyData)
- ❖ **The significance and status of scientific data** (incl. post-truth era)
- ❖ **The future role of media and control**
(incl. freedom of speech)
- ❖ **Cybersecurity and data privacy**
- ❖ **Something else, what?**



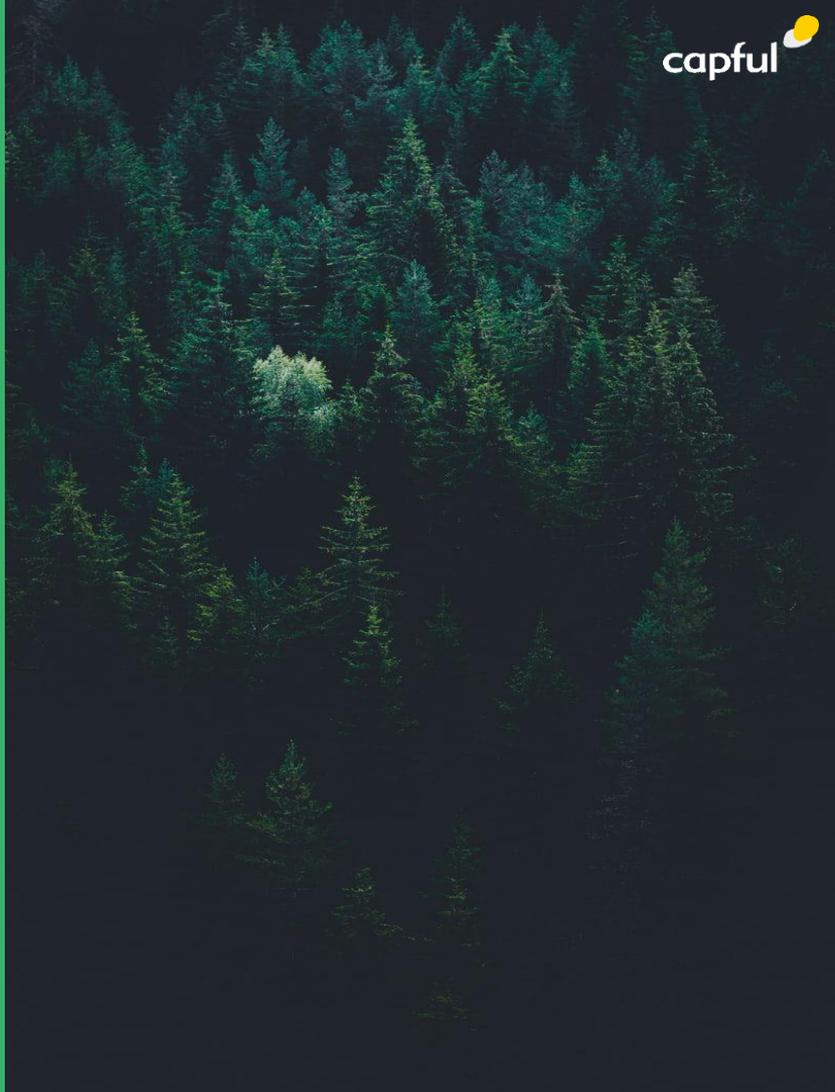
Social ideologies, religions, cultures, extremism and terrorism

- ❖ The rise of extremism
- ❖ New sense of community and tribes
- ❖ New forms of terrorism (incl. attacks on infrastructure, disinformation)
- ❖ Conservatism, liberalism, populism
- ❖ Ecological and ethical values in consumption (incl. eco-anxiety)
- ❖ The significance of individuality
- ❖ Trust in society
- ❖ The future of representative democracy (incl. party politics)



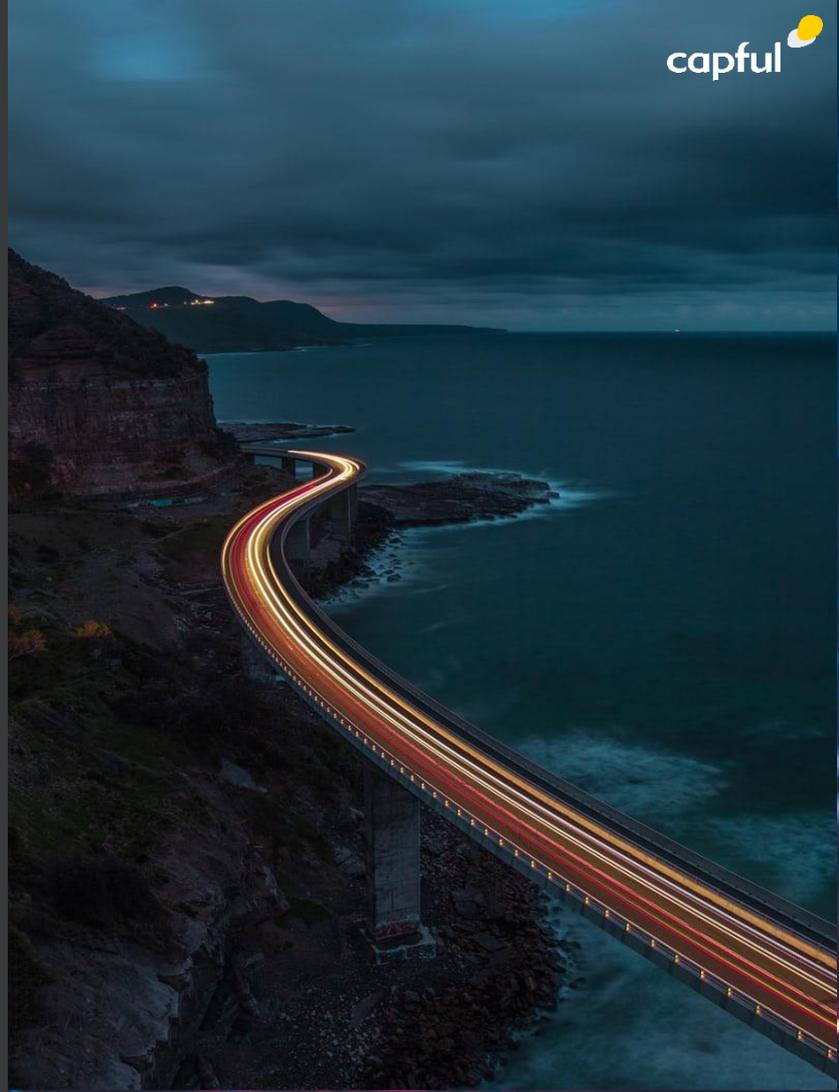
Bioeconomy and circular economy

- ❖ **Replacing fossil fuels with bio-based fuels**
- ❖ **Wood construction**
- ❖ **Sufficiency of protein:** (New alternatives to meat, dairy and fishing industry and plant production)
- ❖ **Sufficiency of clean water** (incl. the development of hydrotechnology and international water reservoirs)
- ❖ **Material circulation** (incl. from waste to energy, side streams, utilization of plastic waste)
- ❖ **Availability and price development of valuable metals** (incl. battery metals and their recycling)
- ❖ **Sufficiency and availability of bio raw materials**
- ❖ **International steering of trade policy** (E.g. China's import restrictions on plastic)
- ❖ **The development of IoT** (The steering of circular economy, steering of bio raw material streams)
- ❖ **The development of an international competition environment in the bio economy** (food giants dominate the development)
- ❖ **Demand for new products is created** (change in consumers, investments and investors)



Energy and cleantech

- ❖ **A smart energy system**
- ❖ **Demand and need for electricity**
- ❖ **Energy policy**
- ❖ **Competitiveness of renewable energy** (technological development)
- ❖ **Energy market and trade areas**
(incl. the Energy Union, Finland as part of the global energy market)



Health and wellness

- ❖ **Personalization** (incl. customized treatments, genomics)
- ❖ **Preventive and predictive healthcare and wellbeing**
- ❖ **Impact-based healthcare**
- ❖ **Healthcare costs** (incl. the ageing of the population)
- ❖ **Differences in health and healthcare between population groups** (incl. possibilities for healthcare)
- ❖ **Something else, what?**



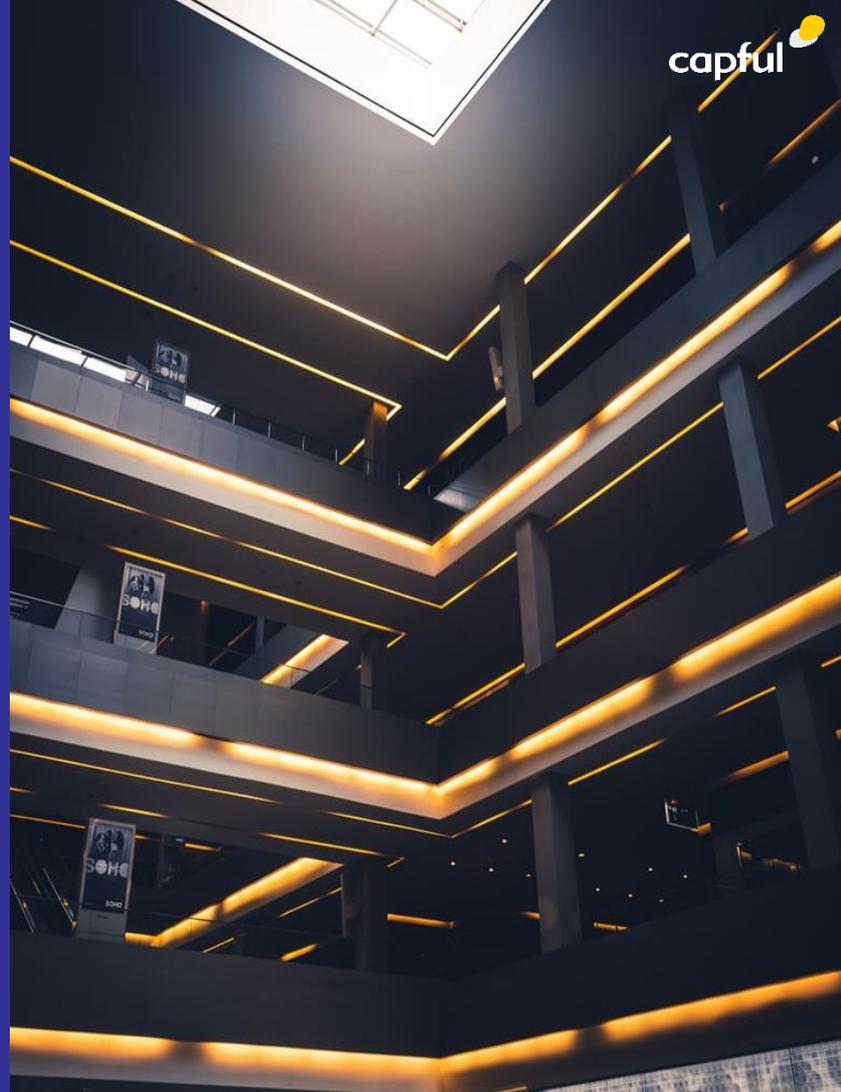
Consumer business and tourism

- ❖ **Technology driven consumption** (incl. online shopping)
- ❖ **Responsible and sustainable consumption** (incl. simplified consumption, 1.5 degree lifestyles)
- ❖ **Change in consumer structure** (incl. urbanization, new consumer groups)
- ❖ **Thrill-seeking** (incl. experience tourism, virtual services)
- ❖ **From owning to being** (incl. immaterial consumption, platform economy solutions)
- ❖ **Something else, what?**



Digitalization

- ❖ **The development of the platform economy** (incl. implementation and regulation)
- ❖ **The future of data processing** (incl. quantum computers, big data, blockchains, edge computing)
- ❖ **Data transfer and storage** (incl. 5G and 6G futures, datacenters)
- ❖ **Digital ethics and privacy** (incl. regulations related to personal data, AI)
- ❖ **IoT & the Industrial Internet** (incl. smart spaces)
- ❖ **Cybersecurity and data privacy**
- ❖ **Gaming industry**
- ❖ **Something else, what?**



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