14.1.2016 • Memo

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Megatrends 2016

The future happens now

ISBN 978-951-563-960-8 (PDF) www.sitra.fi
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Sitra memos are insights produced to support our future-oriented work

Foreword

The decisions of today build the reality of tomorrow. Predicting future lines of development is difficult, but reviewing and analysing different phenomena and drivers of change can direct us to better decisions. The success stories of foresight work come from taking an active role in building a future that meets wishes and visions.

The mission of Sitra is to build a successful Finland for tomorrow's world. Sitra's legally binding mission is to advance the stable and balanced development of the Finnish economy and society, as well as to understand the directions of future developments. Since 2011, our trends lists have been a part of fulfilling this mission.

Sitra's experts represent future talent in their respective fields. In this sense, Sitra offers an excellent view over different trends related to society, well-being, economy, technology and their crossing points. An important part of megatrend work has been to compile different phenomena from the various areas of expertise hosted at Sitra. These viewpoints have gained depth through reviewing futures reports, international and local statistics, academic research, news articles and expert opinions, national foresight research, and different discussions on futures.

Published annually, Sitra's megatrend listing casts light on the phenomena that we already see as affecting our society and especially our future. Sitra's megatrend overview does not count as academic futures research, but rather as a readable and re-usable compilation of current visions, discussions and viewpoints with a focus on the future. We hope that the examination of megatrends proves both useful and rewarding to decision-makers, journalists, students, schoolchildren, or to anyone interested in the world of tomorrow.

The three major drivers of change listed in the 2016 megatrend list are: quickly accelerating technological advancement, an interdependent and tension-driven world, and a global sustainability crisis related to natural resources and climate change. This memo addresses these megatrends individually, but they are also highly interconnected. Each phenomenon is approached through challenges, but also through solutions and opportunities.

Helsinki, 5 January 2016.

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Megatrends in overview

Technology changes everything

At the moment, the pace of technological advancement is faster than possibly ever before. The strides made in different fields of science are enormous. Examples of quickly developing fields include digitisation, virtualisation, artificial intelligence, medical instrumentation, energy technology, block chain technology, digital platforms and global ICT infrastructures.

Technological advancement has a wide-ranging effect on almost all familiar fields, approaches and everyday actions. In many fields, however, the discussion stays among the group of actors who have the best knowledge on the development at hand. This said, special attention should be directed to ensuring that also decision-makers and ordinary citizens could partake in the discussion on our joint future. This is also essential because the speed in which fields like robotisation and artificial intelligence (AI) are developing takes us from questions like what can machines do to questions like what should machines do, or not do. If the human species changes through technology, the ethical discussions arising should be open for all.

In today's scale, technological advancement is especially visible in questions surrounding work, livelihood and inequality. The trends surrounding rapid technological advancement and an ageing population push us to ask: How do the societies of tomorrow renew and develop themselves, and what kind of dynamics are they based on?

Technological advancement should not be seen, however, as a threat as it can also offer splendid opportunities for good living conditions and sustainable well-being in the future. New forms of economy and actions combined with technology can support the empowerment of individuals and communities, meaningful tasks and well-being, as well as ecologically sound economical and societal systems that fit the planetary carrying capacity.

Global interdependency

Global interdependency will grow even tighter. Economic regions are intertwined through trade, investments and financial systems. People, goods, ideas and services circulate around the world. At the same time, national interests and the rhetorics of traditional power politics have been more visible on global arenas. The World Economic Forum uses the term geo-economy to describe the intertwinement of globalisation, world trade, geopolitics and power politics. This type of operational environment seems to suit the ones who have both the size and the ability to take action. According to the World Economic Forum, the winners are the US, China and the EU.

A noteworthy element is that global power relations tend to shift according to new alliances and formations of free-trade zones. China is advancing its own Silk Road, with

an intention to strengthen China's global positioning both economically and politically. The external global challenges dictate a need for players like the EU. Still, the union is in a sticky situation, with simultaneous pressure building from the inside. The instability of the Middle East is reflected all over the world in, for instance, the fear of terrorism and the suspicion planted by it. At the same time, the internal reasons for the region's instability are so diverse and complex that quick solutions are hard to come by. There is a fear that the prolonged instability of the Middle East will continue to have further impact on the rest of the world. Russia's policies, the US presidential elections, climate change, the use of information to maintain and create instability, and the future of international organisations are all significant variables in the global sphere. Sudden changes or other surprise factors can manifest themselves as unpredictable phenomena.

Finland has been the biggest winner of globalisation when comparing different countries between 1999 and 2001, according to a recent report by the German Bertelsmann Stiftung entitled Globalization Report 2014: Who benefits most from globalization?. An important future question arising from the success of Finland will be to understand our inseparable position in the global environment, and how well we find the ways to navigate in this environment.

The global environment is currently highly unpredictable and hard to navigate. It is nonetheless important to set ambitious common aims and to adopt agile practices. According to many indicators, the world has also changed for the better. Setting ambitious strategic aims has made it possible to significantly dampen poverty, crime, international conflicts and war on a global scale. The recently formed Paris climate agreement is an example of a surprising positive path of development,that may have notable impact on the future of mankind.

Sustainability crisis now

The world population produced 40 billion tons of carbon dioxide emissions into the atmosphere in 2015. With the current levels of production, the amount of greenhouse emissions would double in the next 50 years – mostly due to carbon-intensive industry. Air pollution is responsible for the untimely death of more than seven million people a year. At the same time, we are fighting for the sufficiency of critical natural resources. Water, arable land, clean air, and different minerals and other natural resources are in serious threat of running short due to unsustainable consumption. At the moment, the global population consumes natural resources of the equivalent of 1.5 Planets, but if everyone would live like the Finns we would need 3.5 Planets every year.

Climate change and the shortage of natural resources has manifold, dramatic and far-reaching impacts on the natural environment, on human living conditions, and on the economy and society. Thus, the greatest challenge of our time is the decoupling of economic growth from the over-consumption of natural resources and from emissions. Historically, the development of well-being has been tied to both economic growth and to consuming natural resources. Decoupling means the separation of well-being and

economic growth from one another, and detachment from an unsustainable use of natural resources. The growth of well-being should also be pursued during periods of low economic growth and without exceeding the carrying capacity of the Planet through the overuse of natural resources.

The sustainability crisis includes several complex challenges, but finally also opportunities. Climate change can be solved and these solutions can provide tools for well-being, employment and development, as long as we seize these opportunities. Such solutions include, for example, carbon-neutral business, the circular economy and scaling out current best practices.

It is noteworthy to remember that technology alone is not enough to rely on. People and societies remain in the heart of everything through decisions and choices. Even the best technology cannot function without being harnessed. The Paris climate agreement was born at a significant moment – we still have time to take action. Finland has enormous business potential in the cleantech industry, if these opportunities are grasped.

Trends are interconnected

The aforementioned trends are presented as separate items, but it must be stated that they are strongly interconnected and interdependent. They all share crossing points. For example, technology is strongly connected to solving climate change but on the other hand, technology is also a part of the problematic of over-consuming natural resources. The global environment has an impact on how and where technology is being developed and harnessed. Climate change and the excessive use of natural resources, for their part, create new types of security challenges and pressures for action on a global scale. The list goes on endlessly. This said, it is good to take into the account the interdependency of megatrends.

Trend 1: Technology changes everything

At the moment, the pace of technological advancement is faster than ever. The growing amounts of scientific articles, the accelerating numbers of patents and the global growth of technological companies all indicate that we are going through a technological transition period that lists keywords such as digitisation, robotisation, virtualisation, artificial intelligence, all-encompassing instrumentation, automation of transport and logistics, robotisation of production and services, nanomaterial development, biotechnology, technological advancement in pharmacology, quick advancement of energy technology, digital platform development and the globalisation of ICT services and production, including the Industrial Internet. Block chain technology is also a rapidly growing field, and it is anticipated to have the ability to deeply challenge current practices.

The impact of technological innovations on society and on people is always a two-fold process. On the other hand, cultural, economic and individual values affect what kinds of technologies are being advanced. At the same time, technologies under development also affect these values and the ways in which society organises, for example, employment, and education and economic structures.

Digitisation and the possibilities offered by the internet add up to a transition that is equivalent in power to the industrial revolution or the universal distribution of electricity. Not only did these new phenomena revolutionise production, they also radically altered our ways of working, living and housing, as well as what we value and how we see the world. We are currently undergoing a similar transition, which inevitably comes with a mix of challenges in terms of adaptation and immense opportunities that are yet to be seen.

New technologies – what is happening?

Virtualisation and data digitisation. Digitisation is currently one of the most influential structures of technological advancement since an ever-growing number of processes are being transferred into digital forms. Data digitisation has also enabled the rapid analysis of huge amounts of data, which was previously not possible on this scale. Virtualisation relates to technology that permits the mechanical simulation of reality. Companies such as Microsoft, Samsung, Facebook, Google and Nokia have published products that allow the virtual simulation of reality. Through virtual reality, we can sense being in the places presented to us through a device. Travel and cultural experiences become possible without having to transport ourselves physically.

Artificial intelligence. Computers have even better ways of recognising things, objects and shapes, as well as of analysing situations and making decisions based on

these evaluations. Computers can already learn different skills through algorithms and, for example, beat a human at chess or in a poker game. The ability to process and analyse gives machines a great advantage over man. Many tasks that only man was previously able to do can now be automated. Such tasks also include complicated tasks in fields like medicine, law and stock brokerage.

The instrumentation of everything. Modern laboratory technologies, such as blood samples, bacteria and virus scanning, and forensics are becoming more and more affordable, which also makes them more economical for consumers. Soon it will be possible to purchase, for instance, different analytical equipment that can inform the user on their health, air quality, the ripeness of fruit or the exact composition of any material. These technologies are fluently integrated into our environment and mobile devices.

Robotisation. Robotisation makes it possible to produce services that are either fully or partly automated, as well as fully automated production. Robotisation is also related to artificial intelligence in the sense that robots can manage tasks with growing proficiency. A well-known example is a personal assistant robot, currently being developed in different versions by several technology companies. There are even skill contests for robots, and they can handle more and more complex tasks. The significance of robotisation is also currently enormous in the fields of transport and logistics. In the future, self-driving cars, fluid traffic and automated ports, freight centres and drones will dramatically alter the perception of transportation as we know it.

Nanomaterials. The invention of plastic changed many branches of industry. Nanomaterials can now change the landscape on a scale as large as plastic did. Graphene is a carbon-derived material that is active both electronically and optically. It is almost twice as strong as steel and could be used in fields like optics, construction, medicine, and energy and food production. Other carbon-based materials can prove useful in terms of their durability and lightness. For example, nanocellulose can be used to produce plastics, textiles and composites. Replacing cotton with nanocellulose could significantly lighten environmental impacts.

Biotechnology and pharmacology. New biological products can be used to address the needs of food production on a planet that is becoming denser and denser to inhabit. Biological products can also be used in chemical processes, textiles, pharmaceuticals, production and construction. Genetic modification is becoming easier and more precise than ever before. In addition, the simulation of DNA in different environments is a first step towards producing synthetic life. Viruses have been programmed to produce solar panels and batteries. Viruses can be developed into programmable tools for different needs. The combination of energy technology and biotechnology offers new opportunities for agriculture with very low consumption levels of energy, water, emissions and artificial light, all for significantly lower prices than at present. Personalised medicine and nutrition, genetic technologies and simulation, as well as the ability to defeat most known diseases will mean that people can live longer lives.

Energy technology. The price of solar and wind power has dropped quickly. In addition, energy storage advancing battery technology has also developed rapidly. Deutsche Bank estimates that the price of solar energy will drop by 40 per cent by the year 2020. Hydrogen is another interesting field of energy production. In Japan, it is seen as a basis for the future of transportation. Toyota launched a hydrogen car in 2015 and its demand has exceeded expectations. Other interesting directions include

mass-produced power plants based on nuclear technology. Technology giant Lockheed Martin is attempting to build a functioning fusion reactor in the coming years. More and more people are producing their own energy and selling the surplus. Energy self-sufficient villages can already be found in the Danish countryside, where energy production has been a source of new vitality for these communities.

Digital platforms. The likes of social media, Wikipedia, open online courses, open learning, data, coding, translation technologies, search engines and free applications have all been responsible for an unforeseen democratisation of information and an increase in transparency. Digital platforms such as Uber, Airbnb, eBay, Paypal, Bitcoin, Kickstarter, Shapeways, Linux and Wikipedia have radically changed their respective fields. The sharing economy, co-creation and crowdfunding create space for new innovations and new forms of organisation.

Globalisation of ICT structures. Structures such as the Internet of Things (IoT), robot modularisation, co-creation, open data, and self-organised platforms demand standardised interfaces between computers, information systems, data and communication. Some of these interfaces are born out of official standards, and others as products of ecosystems. The holder of the winning standard obviously gains a lot of power. The Internet of Things is expected to radically shift industrial processes.

Block chain technology. A block chain refers to the technology that led to the birth of Bitcoin, and it can serve as a radical game-changer in many fields in the future. A block chain is a distributed database that maintains lists of monetary or other transactions. The transactions are transparent and they leave a permanent mark. This means that no third parties – such as banks – are needed, and that transactions in any field can be made in a faster, more transparent and more efficient way.

Viewpoint:
The World Economic Forum's research on the mainstreaming of new technologies.

2018	2021	2022	2023	2024	2025	2026	2027
Storage for all	Robotisation and services	The Internet of Things	Implant Technologies	Ubiquitous computing	3D printing and consumer products	Self-driving cars	Bitcoin and the block chain
		Wearable internet	Big data for decisions	3D printing and human health	AI and white-collar jobs	AI and decision-making	
		3D printing and manufacturing	Vision as the new interface	The connected home	The Sharing Economy	Smart cities	
			Governments and the block chain				
			A super-computer in your pocket				

World Economic Forum: Tipping Points, 2015

Focal points of technological advancement

Technological advancement is currently raising many questions. There are countless ways to address the topic. The following text highlights certain viewpoints that are especially relevant in society, related to ethical questions surrounding technological advancement, as well as to work and employment and the ability for renewal brought about by an increased speed in development.

Who owns the future?

New technologies offer spectacular opportunities. The current pace of advancement is unforeseen. Both ordinary people and decision-makers have difficulty keeping up with development. Futures discussions often present a view that mankind might change more in the next three decades than in the past three centuries. If this statement proves true, what does the scenario include and who has a vision of the change at hand?

Mankind might change more in the next three decades than it has in the past three centuries.

The modern Western nations of the 20th century have been providing or producing education, healthcare, economic growth, security and opportunities for citizens for decades. The big question for the decades to come is: How does technology affect these nations and their systems? The challenge of modern nations is that after producing so much well-being and economic growth, their leaders may struggle to find other tools for the job rather than fine-tune administrative and managerial systems. Technology may, however, radically change the economy, democracy, administration, ways of doing, and even humans as a species. How can we make political future visions when the status quo has so many interests bound to it? Technology and its opportunities will nevertheless change our world. The question is: Are current future visions relying only on technological advancement? And if this is the case, what do these visions contain?

When we look around for big visions, the paths lead to Silicon Valley in the United States, the technological clusters of South Korea and Japan, and the laboratories of China. For instance, the innovation cluster of Silicon Valley is currently hosting research on humans as a multi-planet species, the mystery of death, artificial intelligence, combining man–machine functions and bringing virtual reality closer. It is probable that we will see self-driving cars, use our vision as a direct digital interface or install implant technology in ourselves to delegate personal tasks or to collect data.

The core of futures discussions is, however, ethics and how much technology will shape humanity. In this sense, the relevant conversations surround topics like AI development, genetic engineering and man–machine interaction. The question will soon switch from "what can machines do?" to "what should machines do?".

The discussions on AI describe well the complexity of the theme. Some of the forerunners in technological advancement have expressed great concern about developing strong artificial intelligence. For example, Oxford University's Professor of Philosophy

Nick Boström has published lengthy comments on the subject. He is worried about the ethical risks linked to developing far-reaching artificial intelligence. The biggest risk is that AI could wipe out the human species, either accidentally or purposefully. According to Boström, AI would be the most important and most radical innovation ever made. It would make scientific and technological advancement explode, and quickly surpass humans in ethical and moral thinking. As AI might also have a will, it could destroy the human species if it wanted to, and it is possible that humanistic values would be meaningless. Boström is especially concerned about this because the pace of current technological advancement could give birth to artificial intelligence without anyone noticing. When the crucial step has been taken, it could be too late to turn back. Boström refers to AI developers as "small children playing with a bomb". This conversation has been joined by the developer of Tesla and SpaceX, Elon Musk, and physicist Stephen Hawking. It is worrisome that when listed as an agenda in everyday politics, the topics read as science fiction. According to many experts, questions of technological advancement should be on the same agenda in global politics as the development of nuclear weapons.

The question will soon switch from "what can machines do?" to "what should machines do?"

The outcomes of the aforementioned technologies can define the whole future of humanity. For this reason, a desirable civic skill would be to understand technological advancement, its impacts on society, work, economy and people, in order for citizens to be fully able to participate in futures discussions.

Treaty for digital ethics?

Futurist Gerd Leonhard states that a Digital Ethics Treaty could in the future prove as important as, for example, the nuclear non-proliferation treaties (NPT) have been. Leonhard suggests that the treaty should include the following points.

- Humans should not merge with technology in a fundamental way.
- Humans should not be allowed to be effectively governed by intelligent technologies.
- The fundamental altering of human nature and the manufacturing of new creatures with the help of genetic technology should not be allowed.
- We should not allow robots and intelligent machines to upgrade, fix or alter themselves.
- We should not allow the open or inadvertent discrimination of humans that choose not to use technology to increase their efficiency or competitiveness.
- We should not allow robots to make ethical decisions, i.e. to become sentient or develop some kind of moral agency.

There is a lively discussion taking place on this topic, since technological advancement is a troublesome solution. A global treaty on digital ethics is, however, an interesting addition to the discussion of technological advancement from a human perspective.

Source: Leonhard, Future of Business, 2015

The shift that challenges our perception of work and livelihood

At the moment, the most visible impacts of technology on the everyday level have to do with a turning point in the working life, the disappearance of professions, an altered way of looking at learning and specialisation, as well as new business models that tend to benefit a singular big winner. The businesses of the new era do not necessarily employ a large amount of people. A good example of all of the previous points is Instagram, which had only 12 employees when it was sold to Facebook in 2012 for one billion dollars. In comparison, the 20th-century photography giant Kodak employed more than 140,000 people at its peak. Similar, radical changes can be expected to occur in almost all fields. This said, technological advancement also triggers a concern regarding the concept of work as many tasks can be automated, including ones demanding specialist skills.

A further concern is a concept coined the "uberification" of work, which refers to the splintering of steady careers and a rise in freelance work to piece together one's income. In Western countries, work has traditionally been a guarantee of livelihood, but also a measuring stick for societal involvement and a balancing board for social differences. We are in the middle of a shift that re-interprets opportunities for work, the organisation of society around work, the meaning of work for one's identity, and our whole perception of work and meaningful tasks.

We are in a shift that reinterprets the meaning of work for one's identity, and what work today can be.

This line of development strongly polarises economic well-being, when assigning work and working no longer function in the same relationship to equalise the distribution of income. This is due to the fact that profits can be gained with less work. The trends of digitalisation and robotisation mean that the value chain is dramatically shorter than before; many fields no longer need labour-intensive steps like raw material purchases, production, transportation, storage, wholesale and retail. To ensure that this line of development does not produce negative effects, new balancing measures are needed.

In this context, the question of basic income often enters the discussion. A new perception of work is only one example in the broader shift taking place in Finland and other Western countries, addressing all fields and activities. Finnish society has already become aware of crisis consciousness. The next step should be to find new opportunities and practices in a smooth and painless transition period, detaching from the old and confining ways of many fields. Is this the end of work or liberation from it? And how is the newfound wealth to be divided?

Journalism and democracy at the crossroads of technology

The media is an extremely important part of society, along with the concept of journalistic freedom. Social media and digitalisation have profoundly changed the opportunities for traditional media to make journalism for the masses, as well as the production structures and audience relationships. The circulations of newspapers are declining and the new generation's main source of information is the internet, peer-to-peer content or self-produced media.

Through a democratic perspective, the change is challenging because political discussion is based on the idea that traditional media is the gatekeeper of publicity. Power has been followed by responsibility; journalistic responsibilities such as objectivity, validity of information, protection of sources of information, and best practices like ethical guidelines in journalism have been decisively important in enabling the media's function as the "fourth estate". Social media has challenged the journalistic structure in a way that basically allows everyone to act as publishers and journalists, as well as to be the ones setting the agenda and defining the sources.

This path has, on one hand, democratised media in an unforeseen manner and empowered people into taking an active role in their own environment. On the other hand, there are undesired by-products of the new situation: quickly spreading false information can be used destructively, and the current online world allows individuals to discredit and threaten others without clear legal consequences. Discussions on social media may also distort an understanding of public opinion, although it must be noted that the concept of public opinion has also previously been troublesome. Taken to the extremes, we can talk about an information war being escalated through social media.

Journalism, like many other fields, will probably undergo great changes concerning work, professional identities, revenue logic and other manifestations. Journalism is not likely to disappear, because the growing amount of information leads to an even further need to interpret information and the surrounding world. Is the journalist of the future also a moderator of online discussions, a professional compiling streams of news from global sources, or a facilitator and interpreter of different online contexts? The breaking point for the media and the implications for democracy are questions that call for urgent answers.

How does society renew itself in the future?

All in all, the fast-paced advancement of technology challenges our social reform process profoundly. For example, the Research Institute of the Finnish Economy ETLA comments on the shifts of digitalisation and working life with a reminder that the societal and economic benefits of steam and electricity were only seen after the new generation native to this technology stepped into power and adapted the processes of the time to these advances. Knowing this, it is estimated that the benefits of digitisation will not be widely visible before 2030.

This time, the demographic realities of Western nations put pressure on society's abilities to reform. The age pyramid of ageing nations is becoming more diamond-shaped than square. Finland is at the forefront of this trend. It is no longer a default that a new generation single-handedly takes charge of development. Instead, various generations are now working together on very different tasks and even in different realities. A crucial question is: how does the social reform process of ageing nations function? It is not enough that young people independently adopt new technologies, sustainable lifestyles and the best new practices. In an ageing nation, all generations must collaborate.

Various indicators show an intense generational gap in European nations. For example, unemployment has been most harsh on young people. This is particularly

alarming because youth unemployment and social exclusion are known to have decade-long implications on individuals. The Vision Europe Summit publication – a joint report by leading European think tanks – defined three fields of policy that have jointly deepened inequality between different generations in the EU. These include a fiscal policy that has strengthened the economic downturn and increased poverty and unemployment – affecting especially young people in Europe. The cuts made by governments have been targeted at education, young people and families with children, but left pensioners aside. Thirdly, the pressure to sustain the pension system contains the flaw of favouring current pensioners over future generations of pensioners.

The Vision Europe report recommends that the division of the inter-generational burden should be solved by different means, such as macroeconomic measures and fiscal policy, labour market reforms and a more balanced acknowledgement of current and future pensioners, both in terms of pension policy and cutbacks.

Various generations are now working together on very different tasks and even in different realities.

Often the frames of thinking acquired at a young age dominate perceptions of the world and its ways. However, the speed of technological advancement is currently changing so many societal and economic processes that new types of thinking are called for. Technology is often an easy answer to a plethora of problems, but it is much harder to change behaviour and thinking. Society must find more clarity in considering reform mechanisms, as well as including everybody in this process. We must examine inter-generational equality as a genuine question. Japan is the first country to make the transition to a phase where the majority of inhabitants are seniors. What are the dynamics of such a society, and how does it alter best practices and the harnessing of technology? Finland is lagging behind in terms of demographics.

Technology creates great possibilities for better living

It is clear that we are undergoing a transitional phase that includes a tug-of-war between old and new practices, leading to friction in almost all fields of human conduct. The level of crisis consciousness has been high, and it is therefore important to also see opportunities in the future. The following list includes different views on harnessing technology to enhance well-being.

Work reconsidered, the platform economy and the division of wealth
Core societal issues in the future include the division of prosperity and everything that is considered as work. As global competition tightens, more and more companies are trying to fit into the small circle of businesses that make it internationally. Coincidentally, population ageing and the automation of work demand an even wider understanding of work, meaningful doing and financing in order to avoid the excluded group growing

too large. A larger number of small and medium-sized enterprises (SMEs), a new type of creativity, problem-solving skills and technological solutions are key factors in this equation. It has become harder to generate value through the traditional method of optimising production. The business world needs visionary value creation, i.e. an understanding of what people need and want in their life.

A further challenge is brought about by the internet, the Internet of Things and digital co-creation and consumption. When the costs of production and distribution are zero and consumption is free, this inevitably changes many fields in a radical manner – and we are most likely only at the beginning of this trend.

The drastic changes in value creation, production and work trigger a fear of technological unemployment and a concentration of wealth into the hands of a small group of people. Basic income is often mentioned as a solution to enhance the diversity of work. In addition, impact investing can prove interesting from this viewpoint. This concept means channelling private capital into initiatives that generate a positive social impact. Internationally, impact investing has been used to tackle, for instance, youth unemployment and homelessness. Sitra is currently developing a model adapted for Finland.

The business world needs visionary value creation, i.e. an understanding of what people need and want in their life.

It is also relevant to consider how new technology and wealth are distributed: are we witnessing the end of work, or the liberation of people from work? The sharing economy and the world of digital platforms have produced business models that employ few people, yet generate huge global business, such as Uber and Airbnb. Uber is currently the world's most valuable start-up company with an estimated value of 51 billion dollars. Uber's profit in 2015 was over 10 billion dollars, and the company has raised over 8 billion through investment rounds. The profits go to a small group of owners. Uber drivers gain some additional income, but not enough for full-time employment. It might therefore be more accurate to speak about a "gig economy" over a sharing economy.

A counter-force to the uberification of work might manifest around the world in, for example, the rise of new forms of co-operatives that offer a chance for a fairer division of wealth. NGOs and companies on the verge of blossoming are busy thinking whether businesses like Airbnb and Uber could be user-owned, with a model to distribute profits more evenly. The Finnish co-operative Robin Hood has copied its algorithm from international hedge-fund investors, and divides all profits among the co-operative as a response to temp work. Loconomics is the co-operative equivalent of the TaskRabbit workforce service. Enspiral Network is a social enterprise network founded in New Zealand, channelling hundreds of professionals and companies into work on social projects. Swarm is the block chain version of crowdfunding platform Kickstarter. Alternative revenue models are only just starting, but their potential for social significance should not be dismissed.

The platform economy is a phenomenon that is in the background of all the aforementioned. Individuals who succeed in looking for information, work, services and products are in the frontline of development and can define complete business ecosystems. Such examples include Google, Uber and Facebook. On the Finnish scale, such services and platforms are also born locally, covering topics such as neighbourhood activities and food delivery.

The return of humanity and ethics

While technology's growing strength will define the future, it will also force us to consider the essence of humanity. This creates endless opportunities to re-position humans at the core of businesses and organisations. Technology can supply us with even better jobs and leadership. Machines tend to be better at processing data than humans. Presently, only humans are able to make moral and ethical decisions, and to come up with ideas. We also have the unique ability to lend emotion to our action. Empathy and everyday problem-solving can be a central aim or source of inspiration.

Technology can facilitate better and more personal products and consumption choices, generating new business opportunities and fields. Humans are the most skilled in finding local specialities as well as customised products and services to address needs. Trust is also a crucial trait within human interaction, and something of high value in current technological services through, for example, customer reviews.

In the future, technology will enable people to work on topics that they see as meaningful, or something worth committing to. Organisations that can offer meaningfulness can also build commitment.

In 10 years, over 75 per cent of the workforce will be composed of "Millennials" (or those belonging to "Generation Y"). Their perception of work and commitment is very different. If we want people to do even better those things that machines will not do, we must find a genuine understanding of the human needs hailing from professional identity and motivations. Leadership should also better address human understanding and the creation of real communities. The true pioneers are the ones who are able to create communities instead of networks within their organisations and businesses. Employment, value and growth are created from unsolved problems, big or small. Data as the main resource of technology also generates abundance, whereas in previous times the use of resources was based on scarcity. If the prices of several commodities drop as a result of easier production methods, what are people working towards?

Empathy and everyday problem-solving can be a central aim or source of inspiration.

Many futurists believe that businesses of the future need not focus on production, but rather on generating happiness and well-being. Technology also triggers many ethi-

cal questions. Soon we will no longer need to ask what machines can do, but rather what they should do and should not do. These questions become relevant with discussions such as the genetic manipulation of unborn children, robot and AI decision-making, and whether machines should be coded with a moral agency and an ability to apply it with insufficient facts.

Therefore, one of the most crucial topics in the years to come may be digital ethics. The biggest questions surrounding technology might not deal with technology as such, but with people and humanity.

Organisations reinvent themselves

A completely new phenomenon is a work market based on digital platforms independent of time and place, and built on exchanging individual tasks without actual employment relationships. This phenomenon has been labeled as the "gig economy", and the uberification of work.

Digitisation has made it possible for companies to purchase various necessary support services with the click of a button, instead of producing these services in-house. New companies can grow quickly without big investments in IT systems or office spaces. Instead, they can pay as they go to providers offering these services. There is a flexible international online market for product development or, for example, producing pieces of code. Crowdfunding has made it possible to gain capital. This type of model differs greatly from the industrial era of the 20th century when the link between labour, organisation and production was linear and strong. Many other changes are also taking place, previously guaranteed by the organisation. These include identity, belonging and accessing some of the profits.

Digitisation has also enabled more direct communication between the organisation and its clients. No player is now able to disregard the consumer experience. Where the enterprise of the past century was dependent on trust, advertising and selling, the businesses of the 21st century can be said to depend on reputation, communities and developing users' access to their products. This has also inevitably created a new type of demand from the customer's side.

The discussion on leadership and organisational structures of the future has interestingly created an idea of meaning, self-organisation, creativity and hierarchy-free organisations as the fuel for innovations. The Dutch healthcare company CEO Jos De Blok – who visited Finland in August 2015 – had a long career as a nurse. Through the years, he felt that many healthcare tasks should be handled differently. These thoughts led him to found the healthcare company Buurtzoog in 2007 with four other nurses. The company has no managers or hierarchy, employees recruit their own colleagues, everyone gets paid a little more than by competitors, and the core of the business lies in employee professionalism and ethics. Buurtzoog has quickly snatched 70 per cent of the Dutch healthcare market with the support of its innovative thinking. The organisation philosophy is based on keeping things simple, meaning a focus on the actual care work. Buurtzoog's turnover was 300 million euros last year, yet their annual report was only one page long.

A common question in a highly complex, technology-ridden world is how to act. At its simplest, the answer can be the path paved by Buurtzoog: by simplifying practices and processes as much as possible, by lowering hierarchies and by focusing on the essential.

Digital economy trends

The internet of me. People are even more clearly the central figures in technology. The user experience dictates the winners of digital commercialisation.

Outcome economy. The spreading of new business models with a focus on process instead of results.

Platform (r)evolution. The platform economy and platform-based business gain importance. Digital platforms serve as tools for consumption choice. They are also used to create full business ecosystems.

The Intelligent Enterprise. Successful companies thrive on smart technology, products and systems.

Workforce re-imagined. Technology becomes an even closer co-worker as devices are worn, attached to systems and used to broaden work capacity.

Source: Accenture Technology Vision, 2015

Technology as an enabler of sustainable well-being

The perception of well-being must be broadened. Ecological sustainability places its own limits on human actions. On the other hand, the well-being challenges of Western societies have more to do with mental well-being, social capital and lifestyle diseases. A broadened scope is therefore necessary to imagine sustainable well-being.

Sitra's view on sustainable well-being means stretching the concept of well-being to include new challenges of mental well-being, such as belonging, happiness and meaningfulness. This means: empowering individuals and communities and boosting performance in a complex world; the importance of work and meaningful tasks as a part of well-being; fitting into the ecological carrying capacity; a more communal and human-centric economy; and inclusive, adaptive and proactive administration, healthcare and education.

From the viewpoint of individuals and communities, new technology has opened up great opportunities for finding communities for peer involvement and support. At the same time, local communities can operate more fluidly with the help of social media. In the future, 3D printing will facilitate a new type of local production of food, clothing and other commodities. This could create local and meaningful work on a new scale. Virtualisation and open data can also offer high-level services to smaller local communities, independent of place. Food production and agricultural innovations and technologies such as underground farming can also support locality. On the other hand, collaborative opportunities in business, studies, hobbies and social interests become more accessible due to their independence of location. It is important that technology serves people and communities and not the other way around.

Artificial intelligence can be used to decrease the perceived complexity of the world in individuals, and the processing of large amounts of data can be delegated to robots. In the fields of administration and politics, large quantities of data and artificial intelligence can be used to find new best practices and produce better solutions for larger groups of people. Data collection can be used to address the experiences and needs of masses of people. This could challenge the distorted image of reality created by social media and tackle the role of traditional media as the reflector of social realities.

Technology is now a key to reaching ecological sustainability. New technological solutions can reduce emissions in multiple ways, and they also serve to advance sustainable lifestyles on the individual level. Technological innovations surrounding transportation, housing and food production support this development. In addition, co-production and communal consumption, as well as opportunities derived from virtual reality can further sustainable lifestyles.

It is likely that we will witness great innovations in the fields of healthcare and education. Robotisation, virtualisation and instrumentation could offer useful tools for early diagnostics, disease prevention and forecasting, self-treatments and other health advances. Remote access could improve healthcare cost efficiency and consultations. 3D printing, automatic recognition and neural-controlled exoskeletons or prostheses could offer help to blind or disabled people. Automated transport could lower costs for ambulances and taxis. Senior citizens could receive better care if routine tasks such as cleaning and cooking are robotised. People could then focus on keeping company and caring. More and more illnesses could be treated and genetic technology could anticipate and prevent different diseases.

Technology will play a significant role in the educational field of the future, but this will most likely require the re-configuration of the education system on many levels. Technology is not an intrinsic value, but the value lies in how it is implemented for learning and teaching. Technology can be harnessed to improve data collection, global online education material, simulations, trials, gamification, and so on. In contrast, the rise of human values is also visible as a counter-force to technology. The world of education can balance technology by including interaction, empathy, creativity and multicultural competence – essential future skills listed by the Institute for the Future.

In their book Second Machine Age, MIT researchers Erik Brynjolfsson and Andrew McAfee present solutions to solving the social tension brought about by technology in both the short term and long term.

Short-term solutions in the technological shift

Good education. A good education system unites all countries that perform well in economic and social rankings. Competent teaching staff and good basic education mixed with creativity, technological applications and new innovations such as online learning tools form a base for the future. Competent, creative and well-educated children are an investment worth making.

Creative entrepreneurship. Entrepreneurship is the best way to create employment. Ambitious creative entrepreneurs are the best at coming up with new jobs and fields of business. Innovations are more easily born out of companies that are open to new ways, and that dare to make new combinations of products and services. Not everyone has to adopt a Silicon Valley lifestyle, but governments, businesses and individuals can stabilise an encouraging entrepreneurial base through, for example, trimming bureaucracy and creating platforms for different partnerships.

Matching labour and needs. Smart and efficient databases and innovative services could be a good topic for a national innovation competition. Better mapping of skills and fitting them to private-sector needs has a lot of unused potential.

Top-quality fundamental research. Fundamental research is a prerequisite for innovations and needs a good financial support network. The internet, GPS, voice recognition, touchscreens and many other widely spread innovations have been based on fundamental research. A good way to produce innovations based on fundamental research is to announce calls for innovations. For example, self-driving technology first appeared through the DARPA (Defense Advanced Research Projects Agency) one million dollar Grand Challenge for innovations that sought our solutions for self-navigating cars.

Investing in infrastructure. The revolution of digital technology cannot bypass the importance of basic infrastructure. The types of streets, highways, airports, harbours and traffic systems in a country contribute partly to the attractiveness of know-how and business.

Immigration. Immigration not only benefits the immigrants, but also the economy receiving these people. Even if the immigrant population has a lower overall level of education, immigrants from countries like Cuba and Russia have not led to a decline in the economy of employment in the United States. On the contrary, 25 per cent of the fastest-growing companies in the country in the period 1990-2005 were founded by immigrants. Immigration stimulates the economy, and increases labour and entrepreneurship on many levels of society. This is an opportunity not to be missed. Countries can support immigrant entrepreneurship by, for example, granting start-up visas to facilitate the setting up of new businesses.

Smart taxation. Well-placed environmental protection taxes solve problems, generate cash flow and support the development of innovations to replace traditional goods and services with more sustainable solutions. Higher taxes on extremely centralised wealth are also called for in the future. As an example, the US President Bill Clinton raised the level of income taxes, but the US economy still experienced a high rate of growth in the following years.

Source: Brynjolfsson & McAfee, The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies, 2014

Long-term solutions in the technological shift

Utopias or deceleration are not solutions. Blocking technological advancement is as pointless as burning books. Instead of deceleration, we should focus on new ways of working. If there are not enough jobs or wages, there is also no demand for new digital goods and services.

Basic income. The basic income discussion has surprisingly long roots. For example, the concept was addressed in a 1967 speech by Martin Luther King Jr. There is support for the system from economists on both the left and right. Finding a system for basic income has been of high interest in recent times due to the technological shift of work.

Negative income tax. A negative income tax is the combination of taxation and automatic income support. This model defines a minimum of taxed income on a monthly basis. All earnings below this line are taxed negatively, meaning income support. All earnings above the limit are taxed normally.

The peer economy and artificial intelligence. People continue to have a lot to offer to the working life, especially while developing man–machine combinations and using machines to boost human profitability and creativity. Machines cannot do this alone. Crowdsourcing and different forms of peer production have an important role to play, using technology as an enabler. Such services include Airbnb, TaskRabbit and Uber. Crowdsourcing labour markets already exist in fields such as programming and design.

Source: Brynjolfsson & McAfee,
The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies, 2014

Trend 2: Global interdependency with growing tensions

Global interdependency is increasing more and more. Although economic growth has slowed down globally in the past years, globalisation is about much larger paths of development and correlations than merely free trade. In spite of the economic slowdown, economies are intertwined through trade, investments and financial systems. At the same time, national interests have re-entered public debates with more strength, and nationalistic and protectionist forces have re-appeared. Criticism of the EU has grown and the support for right-wing populist parties runs on a thematic of opposing phenomena deriving from globalisation. Counter-reactions to globalisation are also seen in religious and cultural movements.

In spite of the economic slowdown, economies are intertwined through trade, investments and financial systems.

At the same time, interdependency is even more pervasive and linked to everyday life. Our daily lives are interconnected with the rest of the world. The Finnish economy and labour market are tied to export and global delivery, production and value chains. The instability of the Middle East is visible all the way to quiet northern villages due to an unforeseen flow of refugees. An act of terrorism in Central Europe also shakes up our own perception of security. New social media, like Periscope, allow us to visit the house party of a band of Russian friends behind the Ural Mountains in real time, or to witness the joking of Riyadh teenagers. On the other hand, information also creates instability and the online world is infested with a war of opinions. Climate change affects everyone, and knows no national borders.

The planet is shrinking like never before. Our world is, however, more and more interdependent and complex, so our challenges cannot be addressed with known means and reactivity. We need an understanding of which challenges are local, which are national and which are global, how different levels mix and what sort of tools are useful on each level in order to find apt solutions in a complex environment.

A species whose population has exploded on a small planet is forced to deal with diversity in a new way. Although Europe is restructuring its borders, these borders might in reality have very little significance if and when conflicts and climate change escalate. Man must, for the first time in history, adapt to planetary borders instead of nation-state borders.

The rise of the geo-economy

A report published by the World Economic Forum considers "geo-economics" as a concept intertwining globalisation, world trade and geopolitical power politics. According to the report, geo-economic competition shapes the global economy and its practices.

"The language is trade but the logic is war."

The biggest battles are fought among the superpowers of the world, on all continents. The conflict in Ukraine increased tensions between Russia and the West, the sabre-rattling of China and its neighbouring nations in Asia leaves a mark on trade relations, and the rise of ISIS in the Middle East relates to a wider conflict and affects almost all nations in the region. All over the world, new powers and communities are rising, and the currently introspective USA is looking to redefine its position in the global status quo.

Despite several bloody conflicts the world over, most global battles are fought in the field of economics. This is why geo-economics is a fitting term for the situation described by the World Economic Forum as having the "language of trade but the logic is war".

It must, however, be acknowledged that this type of policy is nothing new. The post-1990 years have – up until recent years – been defined by an idea of a multipolar world. This line of thinking has been governed, at least publicly, by the political elite's views on heightened economic interests as the fuel of power politics.

Geo-economics is simultaneously the antithesis and the greatest victory of globalisation. It has made the power of interdependency evident regarding shared interests. The threat of being ousted from a community also dampens conflicts. On the other hand, there is a visible trend for realpolitik-style exercises of power that is seen as as important as economic success. This translates into the reintroduction of superpower politics and strengthening nationalism in internal politics. But the economic logic of war is breaking the base of the positive aspects of globalisation. The winners seem to be the ones who can self-manage their own fate. According to the World Economic Forum, such players are the USA, China and the EU. Out of these, the EU currently faces great internal challenges. The solutions to these will define the European future.

International organisations are facing great challenges due to being disregarded in the era of geo-economics. Global leadership and the lack of global norms and standards have eroded the operational logic and opportunities of the multipolar world, leading to a specific concern about the future of international organisations. Finland has historically benefited from multilateralism and strong international organisations. It is interesting to see whether global agreements surrounding climate change and resource scarcity can stand as a counter-force to the struggles of international organisations brought about by geo-economics.

Views on the trend from around the world

Many events around the world have a part to play in the trend of geo-economics. Some relevant phenomena related to the trend include new alliances and free-trade zones currently being born in different corners of the world, the future of the EU, the shaping of the situation in the Middle East and instability derived from it, as well as climate change.

New alliances in tectonic shift

At the moment, new blocks, partnerships and free-trade zones are being created around the world. China and Russia have for several years now challenged the leading position of the West in global politics and economics, and these countries have decisively formed relationships of their own. China is pushing the Regional Comprehensive Economic Partnership agreement as an answer to the US-led Trans-Pacific Partnership. Several Asian countries lie between China and the US, attempting to adjust their moves to superpower interests, ending up with complex arrangements to please both parties.

China has made a significant commercial and foreign policy-driven opening move: the formation of the new Silk Road Economic Belt, with the aim of shifting the economic and strategic focus towards the West and Europe. The initiative has the tagline "One Belt – One Road". In mental images and geographically speaking, the historic Silk Road is recreated as a logistic bridge between Europe, the West and China, running through Central Asia. The initiative enables a new, more secure route for Chinese products to enter Europe, one of its most important global markets. The new Silk Road contains huge economic interests, railway and highway connections, as well as oil and gas lines. Its logistics systems concern 60 nations, 70 per cent of the global population and close to 75 per cent of the world's energy resources.

At the moment, new blocks, partnerships and free-trade zones around the world challenge the known power relations.

Alongside the land route, there is a plan for a maritime Silk Road, with the idea to connect the continents and oceans from the South China Sea to South-East Asia, India and Africa. A central aim in an initiative that reaches politically out to the West is the stabilisation and expansion of the Chinese economy and Chinese influence. The start of the Silk Road project coincided with another Chinese-led initiative called AIIB – Asian Infrastructure Investment Bank – joined by 56 countries, including Finland. In terms of internal policy, China is looking to stabilise an economy that is unequally divided between coastal cities and the western inland.

Russia's attempts to create a Eurasian Union have backtracked due to the conflict in Ukraine, which Russia had previously insisted be included. The union plans are moving forward with Belarus, Kazakhstan and Armenia all supporting the geo-economic strategy of Moscow. It will be interesting to witness how Moscow and Beijing come to realise their parallel integration projects, and how the countries in between them choose their strategies.

In Latin America, Brazil and Argentina have been strong characters within Mercosur. Now they are being challenged by Mexico, Colombia, Chile and Peru, who are devising an alternative to Mercosur through the Pacific Alliance.

In recent years, the rising geo-economy has strongly challenged the post-Second World War world order. The challenge is that many international organisations have been swallowed up by the new alliances. The mandates of international organisations are global, but their resources and the opportunities for solving their own current questions are limited. Such organisations include the UN and the World Trade Organization. Their tribulations pose a great risk, and their weathering would severely destabilise international co-operation. There is, however, an even heightened need for global actors and institutions. In this sense, these organisations have not become antiquated, but there is a need for new practices within them.

A new direction for the UN

The 70-year-old UN is facing even greater challenges. Many of its practices were created in the post-Second World War era by the victorious allied nations. The achievements of the UN must not be discredited, and its importance is all the more clear in turbulent times. Therefore, the questions about its capacity to reform itself are currently crucial. Near-future challenges for the UN include the division of power and the position of rising nations, adaptation to new structures formed beyond nation states, and the UN's relationship with civil society.

The division of power has much to do with Germany and Japan, the losing parties following the Second World War. The two countries are still exercising less power within the organisation then their size would merit. On the other hand, newcomer nations such as India, Brazil and South Africa are feistily challenging the current order of the organisation. The unclear role of rising nations is evident everywhere, and the loose coalition of developing nations, G77, has turned non-co-operative in recent years. The interests of the least-developed nations fit better and better with the conscious north then with the rising nations driven by self-interest. The most complicated problem is the division of power within the UN Security Council where African and Latin American countries, for instance, have no permanent membership. The challenge goes beyond questions of legitimacy and representation, as the Security Council must ensure international security through its actions. If and when it is not able to do so, its legitimacy inevitably crumbles.

Another challenge is the adaptation to new alliances and regional integration projects born beyond nation states. How are the EU, the African Union, the Arab League, Caricom or Ecowas represented in the UN, when they are shaping and putting UN decisions into practice? It must also be noted that these international organisations support the work of the UN, such as measures taken by the EU in the refugee crisis, the actions of the Arab League regarding Syria, or the role of the African Union in South Sudan. It is, however, difficult for the UN to define a formal role for such actions.

Finally, the UN will inevitably have to reconsider its relationship with civil society and the private sector. The UN is largely a transnational organisation where non-governmental organisations have difficulty establishing channels of action. In spite of an attempt to enhance the position of NGOs in negotiations surrounding sustainable development, the registration practices of NGOs have become politicised. There is a group of nations in the background that sees civil society as a suspicious Western plot. On the other hand, the UN's poor attempts to mobilise the private sector is threatening one of the organisation's core tasks – supporting sustainable development. The new aims for sustainable development cannot be met if the UN does not find a more fluid co-operation with the private sector.

Source: Janne Taalas, Ulkopolitiikka 3/2015

Where is the EU heading?

A crucial question for Finland is the direction of the EU in the near future and in the long run. The EU has been an exceptional success story. The decade-long integration of a continent torn apart by war has made Europe into one of the world's most stable places, where goods, services, people and capital have been able to move freely. The EU is a unique structure: much more than an international organisation, yet less then a federation. Well into the 2000s, the structure supported and produced what Europe seemed to need: peace, prosperity and stability.

In the past years, the union has faced growing challenges. The eurozone has been creaking under a financial crisis started in 2008, driving the whole region into economic difficulties. The total production of the eurozone remains significantly lower than before the crisis. Unemployment rates are at a record high, public finances have deteriorated and debt levels have increased. Five member states have had to turn to other members in order to balance public expenditure, and Greece has been driven into a debt restructure agreement. One government after the other has toppled over, or lost its mandate in elections. Countries in crisis in particular have witnessed a loss of confidence in political institutions, and different populist and nationalist movements have strengthened.

The EU is in a situation where its biggest challenges stem from the inside while there is a huge need for such a structure from the outside.

Political response mechanisms in the eurozone have been weak, and decisions have only been taken as a response to market pressures, instead of proactively. The identity of the economic and monetary union has proved problematic, as monetary policy has been centralised while economic policy has been decentralised, and no political support has been found to change the situation. According to scenarios produced by the Finnish Institute of International Affairs and the Research Institute of the Finnish Economy, ETLA, the intra-eurozone economic structures should be closer to one another, with free mobility of labour and capital, wage-setting should be flexible in different corners of the region, and stabilisation mechanisms should be implemented among the public sectors of different countries.

At the same time, the instability in the Middle East has triggered huge pressures as a result of population mobility. Member states have been divided in their responses to the refugee crisis. A visible division lies between the Western and Eastern member states. The Schengen treaty guaranteeing free movement within the EU zone has, for the first time, been questioned with the appearance of border controls and fences to hinder free mobility. The crisis has served as fuel for right-wing populism and far-right movements in Europe. The strengthening of the far right could threaten the current ideological base of the whole of Europe.

In addition, the EU also faces challenges with Russia after the conflict in Ukraine, as well as through a fear of terrorism and the UK's upcoming referendum on EU membership, due to be held in June 2016. The UK's potential decision to leave the EU would greatly

affect the union's coherence, and even lead to difficult scenarios where the independence movements in Scotland, Catalonia and other regions gain even more popularity.

In short, there are many problems and their scale is huge. The EU is in a situation where its biggest challenges stem from the inside while there is a huge need for such a structure from the outside. There are increasing problems with the world's ever-condensing challenges and opportunities that know no national borders, such as climate change, an interdependent operational logic, the fast flow of information, terrorism, crime and global trade. In the meantime, Asia is evolving the world's biggest free-trade zone, RECP, China is building a new Silk Road, and Russia is driving for more power through the Eurasian Union. The field of global politics is dominated by big players, strategic partnerships and alliances, as well as an unstable operational environment that is hard to navigate, where sudden events can quickly spark instability.

Knowing what we know about the contemporary world, it is essential for Finland to consider where to find partnerships. The country has never been disconnected from the global environment. An export-driven economy, global value chains, worldwide communications technology and international co-operation have defined Finland's success, especially in the last three decades. The nation state struggles to act independently in a time of interdependency. Local and global operational environments demand customised political mechanisms in order to respond to their respective challenges. The EU's development is one of the most important questions facing Finland. Finland's global positioning is directly linked to the failure or success of the EU.

Finland has been a winner of globalisation

Future global perspectives are especially interesting for Finland. As an example, the German Bertelsmann foundation reported that Finland has been the biggest winner from globalisation. The report evaluated the period 1990-2011. This phase was examined with different indicators of globalisation, such as the percentage of exported goods and services in the gross domestic product, investments in and from different countries, and the volumes of various transactions linking that country to the rest of the world. On the other hand, the movement of goods, services and capital that restrict the globalisation of a country were also measured. Social and political indicators tracked the reachability of personal contact, flows of information and culture, as well as international agreements, diplomatic representation and participation in international agreements and organisations. These variables have been indexed in the report and operationalised through figures representing income per capita, as well as through taking into account different background factors in order to prevent underestimating or overestimating a country's economic performance.

The winners from globalisation are defined through a growth in income levels, and a globalisation index. The report portrays lengthy analyses of different phases and indicators, but according to the absolute growth of income levels per capita, Finland comes in first place – followed by countries like Denmark, Japan and Switzerland. The rise in absolute income levels in Finland in the period 1990-2011 has been 1,500 euros per capita, according to globalisation indicators. The report also notes the impact of the Finnish technology and telecommunications industries on the ranking, but the roots of success lie nevertheless in the carefully constructed connections to the rest of the world in spite of Finland's historic positioning, squeezed between the East and the West. The report suggests that Finland and the other Nordic countries remain good places to invest, although the report also offers a reminder that the dynamics of these highly developed nations are less lively than that of developing nations.

Source: Bertelsmann Globalization Report 2014: Who Benefits From Globalization?, 2014

Instability in the Middle East and worldwide ripple effects

Global tension is all the more catalysed by the long-term instability of the Middle East. Islamic fundamentalist terrorism and the concern over the foothold of ISIS in the region and beyond concern not only Europe, but also the whole world. In November 2015 alone, close to 250 people lost their lives and hundreds were wounded in attacks taking place in Mali, Nigeria, France and Lebanon. ISIS, Boko Haram, Shabab and al-Qaeda have been committing terrorism around the world for more than a decade.

Europe and the United States have received their share of attacks, but it is noteworthy that the problem is global. Egypt, Afghanistan, Gaza, Indonesia, Belgium, Spain, Jordan, Turkey, Kenya, Mali, China, Russia and the United States are all on the list. The Global Terrorism Index in 2014 evaluated the countries of highest risk to be Iraq, Afghanistan, Pakistan, Nigeria and Syria. Muslims represent 97 per cent of the global victims of terrorism. Still, the situation in the Middle East, Islamic fundamentalist terrorism and instability brought about by ISIS actions are ranked as among the highest risks on the European security policy agenda.

The control over natural resources and interests of power politics are parts of the problem.

Alongside terrorism, the kind of transnational violence perpetrated by ISIS is a highly visible threat to European foreign and security policy regarding the Middle East. Although the power of ISIS has weakened in the past year and the organisation has not managed to take over new areas of land, there is a risk of attacks outside its direct areas of influence. In order to compensate for the strategic losses in the area declared by ISIS as a caliphate, the group might seek demonstrations of power through terrorist attacks outside the region. An especially alarming scenario for Europe is the increased tendency of ISIS to inspire supporters to conduct attacks in Europe. The attacks by these lone wolves are hard to predict, and they have become less sporadic. ISIS is a terrorist group that functions according to a new logic: a regionally centred organisational structure with a dispersed, self-managed support network.

Bringing down ISIS would not solve the root causes of the breathtakingly complex problem. The web is woven from a power vacuum left by post-dictatorship Arab states, the lack of civil society and opposition, non-existent political alternatives in a culture of persecution, the extreme exclusive views of Sunni and Shi'ite groups regarding religious interpretation and a fight for power in the region. The battle is also characterised by strong incitement to hatred between different groups. The control over natural resources and interests of power politics are also a part of the problem. Another alarming factor is climate change and its serious impacts already visible in the region. Due to its complexity, the situation in the Middle East cannot be analysed or solved through a simple frame.

The pessimistic scenario derived from the complex tensions is that the war is only starting in the region. New groups are attempting to fill the power vacuum as one player is ousted. At its worst, the cover of the Middle East boiling pot is being dis-

lodged, potentially leading to a long war, conflicts and terrorism spreading to the outside world. For example, the foundations of al-Qaeda were laid in the war of the 1980s in Afghanistan, witnessing the flow of Islamic militia from all over the world. The power of the group became evident only in the 1990s and 2000s. ISIS and the Syrian conflict are most likely to spark a trajectory dotted with impacts lasting decades – in Europe and across the whole world. It is also probable that the current governmental system is facing a re-evaluation in the Middle East. The effects of this procedure cannot be underestimated.

Climate change is the surprise factor in the global environment

Climate change creates its own dimension in the interdependent global operating environment. Phenomena triggered by it can alter the course of global politics rapidly. Climate change has the potential to alter worldwide security threats with potentially unexpected consequences the world over – and this development should not be underrated.

The Center for Climate and Security – a US organisation – published a list of the risks of climate change and security in 2015. The threats are not necessarily directly derived from climate change, but from how climate change affects existing security threats. Climate change can be said to have both direct and indirect impacts.

Direct risks are related to critical infrastructure, such as rising sea levels or extreme weather conditions that can harm energy, financial and food supply resources. In some cases, climate change can even place whole island nations in peril. Indirect risks have to do with the resources critical to national security. Shortages or imbalanced availability of water, food and energy can lead to substantial security risks, political restlessness or large-scale migration. These factors are often closely intertwined with internal conflicts and the deterioration and downfall of nations.

The Center for Climate and Security's report is ambiguous regarding the outbreak of war. Climate change is unlikely to be the sole direct instigator of war, but the impacts of climate change can add to the probability of conflicts, as has already been witnessed. For example, factors leading to the Syrian crisis include a long-term drought leading to a mass relocation to urban areas, political restlessness, a discontent with the government's ability to respond to the situation, a long-running misuse of water and land resources, and poor administration of increasingly scarce resources. The research group examining this topic emphasises that the reasons are usually not linear, but more related to background stress factors regarding the sufficiency of energy, water and food, as seen in Syria at the moment.

Nations in the southern hemisphere are often the most sensitive to climate change. Compared to the global north, these countries are already in a more disadvantaged position and therefore more vulnerable to the negatives effects of climate change and related conflicts. The political and demographic realities combined with climate change on top of the uncertain availability of food and water define a situation where the Middle East, Africa and parts of Central Asia will be most prone to security risks caused by climate change. In addition, the masses of population along Pacific coastal regions are threatened. In the north, security is shaken up by the melting Arctic regions, clearly affecting regional geopolitical dynamics. Russia's worsening relationships with its neigh-

bouring countries could also lead to conflicts in the Arctic region, an area that has until now remained fairly stable.

Part of the difficulty of awakening a sense of crisis has surely been the invisibility of the crisis on the everyday level, even if scientific knowledge has long forecasted the advancement of climate change. The refugee crisis in Europe might partly awaken people. If climate change develops at its current levels, large parts of the globe could become uninhabitable. In such a case, transnational borders will probably become insignificant. It is, however, difficult to estimate accurate figures. It is clear that if large areas of land become too hot or otherwise intolerable to inhabit, people will leave their homes.

The Middle East, Africa and parts of Central Asia will be most prone to security risks caused by climate change.

The so-called black swans of climate change can be sudden escalations of food, water or energy crises, as well as changes in sea currents, rising sea levels, melting glaciers or local shocks in food production areas. Unexpected changes of rhythm in these phenomena can have great consequences.

The operating environment demands both ambitious aims and agile practices

The operating environment has become even hazier and harder to navigate. At the same time, the world has grown smaller. An event on the other side of the world – such as a nuclear disaster, act of terrorism, natural catastrophe or restlessness – can easily have consequences on everyday lives on the other side of the world. The idea of a simple world, one that we thought to exist, is tempting yet unrealistic. Fast-paced technological advancement, climate change and an economy that is dependent on global trade are all dimensions that require new models of action and new capabilities.

We are living in insecure times with events that are hard to predict. It is, however, important to acknowledge that the UN Millennium Goals, for instance, have managed to permanently lower poverty and to enhance living conditions of people around the world. Compiled in 1987 and ratified in all countries, the Montreal Protocol limits the production, distribution and use of substances that deplete the ozone layer. The protocol is an example of well-functioning global co-operation: since its ratification, emissions caused by ozone-depleting substances have been cut by 98 per cent and the depletion has stopped. There are signs of a slow recovery for the ozone layer.

Such efforts show that the world's difficult problems can also be solved through global agreements and joint efforts. Setting ambitious goals and agile practices is necessary.

Cities are important determiners of the future

According to estimates, 70 per cent of the global population will live in cities by the year 2050. Africa and Asia are becoming urbanised the most rapidly, and the expansion of cities on these continents has a great impact on our future. The megacities of the future (defined by having over 10 million inhabitants) are built in Asia and Africa. Cities are either old metropoles with an ageing population or growing conurbations composed of people from a younger generation.

If the megacities growing in the southern hemisphere are not developed through smart, green and socially sound solutions, we could face a situation where two billion people are living in slums. The cities of a complex world can, however, turn out as coherent ecosystems with many positive impacts on quality of life and living environments. Cities are also solving crucial questions on climate change: how we move, eat and live. The types of administration, infrastructure and social cohesion cities embrace define the global future.

At the moment, megacities born in Asia and Africa can offer good opportunities for Finnish know-how, if this trend is grasped and if these cities are supplied with the solutions their inhabitants need.

Capabilities and resilience as building blocks of security

Traditionally speaking, security thinking has been imported from the outside, as a separate entity at a time when a security threat is already in place. Sudden turmoil will be even more likely in the future, and hard to predict. It is therefore wise to develop adaptable and flexible societal structures to fit into surprising situations. A new type of security includes digging to the roots of problems before the consequences become extensive.

Security is like glue that holds society together. One major advantage for Finland has been its ability as a small and fairly egalitarian country to solve surprising crises and to flourish. Security brings trust. Finns have traditionally been able to trust the authorities, and justifiably so. A sense of security is born from a sense of control over one's own life, and a feeling that one is part of a larger community. Legislation should ensure basic services and rights for everyone. At the same time, the abilities and enthusiasm of people are needed to develop solutions that enhance and cheer up living environments. The building of trust is an essential question to a small country like Finland.

As the ways of the world are harder and harder to predict, the new definition of security must include resilience. This means that systems must learn to adapt flexibly to disruptions, and to recover and develop into something stronger post-crisis. Future forecasting is more difficult than ever, but this also makes forecasting important: to map out future opportunities and models for action.

Agility relates to resilience in terms of navigating through changes and surprises, holding on to shared goals. A larger discussion surrounds the renewal of administrations to fit the needs of the 2020s. An increasingly complex and changing world requires administrations that renew themselves both locally, nationally, and globally. European states should set ambitious goals.

Politicians, authorities and other societal actors should have sufficient knowledge of society's challenges, the complexities of the operating environment and interdependency. We need tools and processes to solve challenges strategically and in an agile manner. Many political questions are multi-dimensional, as should be the approaches to solving them. Democracy should be reinforced: the challenges of the 2020s call for innovations that update the century-old toolbox of democracy to better fit the contemporary world. Models of co-operation and shared responsibilities are key in the search for new styles of administration. Nobody can act alone in a complex world.

The world has changed for the better on many levels

It is important to remember that the world is also more equal, prosperous and, in many ways, better than before. The media often portray a picture of the world around us crumbling. Many indicators show, however, that the world has never witnessed a more peaceful and prosperous time as right now. In addition, an examination of data shows that rates of murder, crime, rape, violence against children, armed conflicts and war have all significantly declined since the Second World War.

Resilience means that systems must learn to adapt flexibly to disruptions, and to recover and develop into something stronger post-crisis.

The University of Uppsala's Conflict Data Programme has analysed a trend showing that the numbers of fatal victims of organised crime has dramatically increased in the past five years, mostly in conflicts and especially in the Middle East. This development seems to continue. On the other hand, the amount of violence on a global scale is still smaller than during the last peak in 1994. Post-Second World War conflicts, genocides and wars witnessed the loss of significantly more lives. Even now, the growth in violence does not outnumber the wider trend of diminished violence. It must, however, be noted that although violence has decreased, it is very divided geographically.

The UN Millennium Goals have found ways in the past 15 years to produce an agenda for poverty reduction, which is a basis for sustainable development. The UN Millennium Goals included aims to reduce poverty, to enhance the position of girls and women, to advance healthcare and well-being, and to build better opportunities for living conditions in the poorest parts of the world. According to the UN, these aims have been met on many levels, yet there are also weak points.

By setting concrete aims, millions of people have been lifted from the grip of poverty. Two decades ago, almost half the population in developing nations were living in extreme poverty. This figure has now dropped by more than half, from 1.9 billion to 836 million people. More girls have access to education, and women have secured parliamentary representation in 90 per cent of 174 countries: the number of women represented in parliaments has almost doubled during this period. Infant mortality has halved, and maternal mortality has decreased by 45 per cent. Over 37 million lives have

been saved by battling tuberculosis, and 6.2 million people have been saved through malaria treatments. Some 2.1 billion people have gained access to sanitation. International development aid rose by 66 per cent in the period 2000-2014.

Goal-directed attempts to enhance living conditions are continued through the 17-step UN Sustainability Goals programme, to further poverty reduction, sustainable development, education, equality and environmental protection globally.

Interconnected collaboration is needed – climate as an example

Sudden and surprising changes can alter the course of wide societal arrangements. They can be negative by nature, such as acts of terrorism, natural disasters and escalating climate change, governmental takeovers, political changes, and so on. But the transformative powers can also be positive when background factors are recognised and goals are set, as shown within the UN Millennium Goals, for instance.

New technology, collective action, the sporadic charismatic leader with a will to reform, or the success of the Paris climate agreement could truly change the direction of the global operating environment. The successes are hard to predict, but it is worthwhile remembering that change is always possible. Climate change is an example of a phenomenon that all humankind must respond to together. It will be interesting to see if battling climate change can offer a counter-force to the realpolitik of geo-economics as a shared ambition.

Trend 3: Sustainability crisis now

In 2015, mankind produced 40 billion tons of carbon dioxide emissions. At the current rate of production, the emissions would double in the next 50 years, mostly due to carbon-intensive industries. Air pollution causes over 7 million premature deaths annually.

At the same time, we are battling over the sufficiency of natural resources. Water, arable land, clean air and different minerals and other natural resources are at risk of being exhausted because of unsustainable use.

Extreme weather conditions are becoming more common. The year 2015 witnessed record temperatures, wild weather phenomena and glaciers melting at an increased pace. An estimated 22.5 million people have been forced to flee their homes during the period 2008-2015 due to environmental catastrophes.

To prevent the advance of climate change, the global economy must radically change its course towards a future that is non-dependent on fossil fuels and the over-consumption of natural resources. We must lean on new sources of energy and find concrete methods to decouple natural resources and economic growth. The 1.5 degree Celsius limit set by the Paris Agreement supports this line of development.

The biggest challenge of our time is the decoupling of economic growth from emissions and the over-consumption of resources

Historically, well-being has been linked to economic growth and the consumption of natural resources. Decoupling means the separation of well-being from the over-consumption of natural resources. Well-being should also be an aim during a slow economy, without consuming natural resources beyond the planetary carrying capacity.

The human ecological footprint currently exceeds planetary boundaries. The Finnish footprint is significantly higher than the carrying capacity. Sustainable material consumption on a global scale amounts to about eight tons per person annually. The average Finn currently consumes around 40 tons yearly. Exceeding the planetary carrying capacity is simply not possible in the long run. Decoupling is a prerequisite to adapting to the planetary boundaries in a human and economically sound manner on a global scale to ensure well-being in the future.

Decoupling means the separation of well-being from economic growth.

Decoupling offers many opportunities for Finland. There is an increasing demand for replacing non-renewable resources with renewable ones, as well as for harnessing alternatives that are currently underused.

Solar energy is a good example of a near-limitless natural resource that has only started to be explored on a larger scale in energy production. Theoretically, the Sun's energy surpasses our current demand for energy several thousandfold. The circular economy is another example of a practice that would streamline the use of natural resources. A well-planned and executed circular economy ensures both renewable and non-renewable natural resources are used many times, leading to profitability and less dependency on virgin natural resources. In addition, it is possible to replace product consumption by switching to sharing practices instead of owning. The aim is to use natural resources in a way that does not exceed the planetary carrying capacity.

Decoupling is the only way to avoid long-term economic decline. If the ecological footprint is not adapted to fit the carrying capacity, well-being and economic prosperity will reduce. If decoupling succeeds, we can enjoy the benefits of economic growth while adapting to the carrying capacity of the planet.

There is currently little evidence of decreasing the consumption of natural resources while pursuing economic growth. Some individual examples do, however, exist. For example, Germany has managed to direct itself towards decoupling regarding emissions. The problem still lies in the over-consumption of natural resources, as is explained in a report by Sitra on the German economy and decoupling from emissions. According to the International Energy Agency, total global emissions in 2015 did not grow although the economy did. This said, there is real potential in decoupling.

Even if absolute decoupling has not been witnessed, this does not mean that it should not be an aim. The challenges of decoupling are eased by innovations that make it possible to replace non-renewable resources with renewable ones, and make better use of existing renewable resources.

Decoupling requires a novel mindset, examining the cores of well-being and the economy. This is, however, inevitable in a time where humans have outgrown their habitat as a species.

Views on the phenomenon

Climate change and the insufficiency of natural resources have dramatic, long-term consequences for the natural environment, economy and society. The following part addresses this trend through three different phenomena: lifestyles and over-consumption, conflicts and living conditions triggered by climate change, and the significance on megacities globally.

The one-planet lifestyle

Every year, Earth Overshoot Day marks the illustrative date when global consumption exceeds Earth's capacity to regenerate those natural resources and to handle the greenhouse emissions derived from fossil fuels. The rest of the year can be seen as a debt taken from future generations. The Overshoot Day takes place earlier and earlier in the year. The carrying capacity was first surpassed in the 1970s, and in 1995 the Overshoot

Day took place in November, in 2009 in September – and currently the overshoot falls in August.

Earth Overshoot Day is one way to illustrate deficit spending. It is based on the concept of the ecological footprint, which in turn demonstrates the areas of land and water that would be needed to produce the food, materials and energy currently consumed, as well as waste management. The concept was coined by Canadian researchers Mathis Wackernagel and William E. Rees in the early 1990s. The ecological footprint is measured in global hectares. A global hectare is the equivalent of one hectare of land area with a productivity matching the global average. In 2008, it was estimated that a Finn would need, on average, 6.21 global hectares to support their lifestyle, an Indian would need 0.87 and an American 7.19.

The consumption of natural resources can be more clearly illustrated by talking about consumption in terms of planets. At the present moment, the world population consumes the resources of 1.5 planets, but if everyone lived like the Finns, we would need 3.5 planets. The situation is constantly deteriorating as the global population is estimated to reach 9 billion by 2050, with an even greater resource shortage. The ecological footprint can help evaluate the human impact on the environment comprehensively, as it takes into account the global problems of both emissions and resource scarcity. For example, the resource-smart city aims to fit into the planetary carrying capacity by cutting emissions and gaining control over the consumption of natural resources.

On the individual level, the carbon footprint can be calculated by acknowledging three factors: mobility, housing and eating. The role of citizens regarding the carbon footprint and resource consumption cannot be underestimated. Consumer choices are therefore important, and it is all the more relevant to consider what would make sustainable choices easier, especially in the aforementioned areas of life.

Climate change, conflicts and difficult living conditions

Climate change has its own dimension in the interdependent operating environment, and derivative events can quickly change the course of global politics and phenomena. For now, climate change lies in the background as a variety of security threats, which can have unpredictable impacts – and which should not be underestimated.

One of the biggest threats surrounding climate change is the unreasonable worsening of living conditions in some parts of the world. A trickier equation to solve within the same phenomenon is human mobility near and far. Estimates on human masses forced to move around due to climate change are hard to portray. Impacts and occurrences are complex, not causal.

Different figures and viewpoints on the topic are examined through futures studies, but they share the fact that safe answers are hard to come by. During the period 2008-2015, approximately 22.5 million people yearly have had to leave their homes due to natural disasters. Some 95 per cent of these people live in developing nations. According to the International Panel on Climate Change, extreme weather conditions could become more of a norm than an exception, which has first-hand impacts on places that are already dealing with difficult conditions related to population growth and weak infrastructure.

Estimates say that the amount of climate refugees by 2050 could be anywhere between 50 and 200 million. The methodology and scientific accuracy of these estimates has been criticised. On the one hand, defenders like to point out that similar modelling was also applied to discovering the links between smoking and lung cancer. The well-respected Dutch eco-transformation researcher Jan Rotmans predicts that there could already be over 200 million climate refugees by 2025. The newly appointed Secretary-General of the UN World Meteorological Organization (WMO), Petteri Taalas – also acting head of the Finnish Meteorological Institute – has stated that there are hundreds of millions of potential climate refugees in the world likely to be affected by droughts and worsening agricultural conditions.

Indirect threats and the escalation of the refugee situation can link to critical resources, which are vitally important to national security. These resources include water, food and energy and any shortages or shocks can pose severe security threats and lead to political restlessness or mass migration. These factors are often closely intertwined with internal conflicts and the deterioration and downfall of nations.

Estimates say that the amount of climate refugees by 2050 could be anywhere between 50 and 200 million.

Climate change is unlikely to be the sole direct instigator of a war, but the impacts of climate change can add to the probability of conflicts, as has already been witnessed. Recent studies note that factors leading to the Syrian crisis include a long-term drought leading to a mass relocation to urban areas, political restlessness, a discontent with the government's ability to respond to the situation, a long-running misuse of water and land resources, and poor administration of increasingly scarce resources. The research group examining this topic emphasises that the reasons are usually not linear, but more related to background stress factors regarding the sufficiency of energy, water and food. This development can be seen in the triggers of the Syrian civil war as 1.5 million farmers relocated to urban areas to avoid droughts – an unmanageable situation for the Syrian government.

When living conditions become impossible, conflicts escalate in an absence of resilience and necessary tools. This is often a problem for nations without a steady administration. The drought in Darfur in Sudan has led to a battle over resources between nomad and farmer populations. Some 300,000 people lost their lives and 2.3 million fled as refugees as a result of the unrest in the area. Addressing climate change and creating tools to build resilience is therefore crucial in stabilising conflict areas. Many seemingly ethnic and religious conflicts turn out to be more complex problems regarding the division of resources.

It is alarming that many areas experiencing deteriorating living conditions lie in parts of the world that are already fragile, reflecting as population pressures on Europe. The Middle East and Africa are likely become even more exposed to droughts and an

insufficiency of fresh water and food. The Mediterranean coastal regions are also expected to face serious erosion, drought and water scarcity.

Megacities defining the future

The modern megacity has traditionally been seen as a Western invention, but the current trend of rapid urbanisation is taking place in earnest in East and South Asia. Karachi in Pakistan and Lagos in Nigeria have been at the top of the list with 80 per cent population increases. China and India dominate the rest of the list of the fastest-growing megacities. Close to 70 per cent of the world's population are expected to live in urban areas by 2050.

The biggest number of megacities is currently found in China. For example, the rapidly exploding megacity Shenzhen used to be a small fishing village, with only 30,000 inhabitants in 1979. The current population is over 12 million. The expansion of Shenzhen has been so quick that it is called a city without a history. Older Chinese cities are also growing fast. Shanghai has grown in population by close to 50 per cent since 2000. Beijing and Guangzhou have grown at a fairly similar rate. Delhi has expanded by over 40 per cent in the past decade, Mumbai by 20 per cent and Kolkata by 10 per cent. Other rapidly growing cities are expanding in developing nations. The populations of Thailand's Bangkok, Dhaka in Bangladesh and Jakarta in Indonesia are growing with enormous speed.

> When living conditions become impossible, conflicts escalate in the absence of resilience and the necessary tools. This is often a problem for nations without a steady administration.

Megacity development in Europe and the United States – with accurate statistics – has been slow. Moscow is the only city in Europe or North America to have grown by 10 per cent. Paris has grown by 8 per cent, Los Angeles by 6 per cent, and New York by 3 per cent. For now, the degree of urbanisation is highest in North America, Latin America, the Caribbean and Europe, but urban growth is also taking place elsewhere. The shrinking populations of the West also affect the growth of cities, even if urbanisation is an ongoing trend in countries with a declining population.

What do these figures then tell us about the megacities of the future and their importance? It is clear that the fastest growth takes place in cities with wide poor rural areas and a young population. These relatively poor places, such as Bangladesh's Dhaka and Thailand's Bangkok, will continue to experience rapid growth until birth rates decrease. According to the UN, the 2050 list of megacities will be dominated by cities with low-income levels in Central Asia and Africa. These will most likely include Lima in Peru, Kinshasa in the Democratic Republic of Congo and Tianjin in China. Chennai, Bangalore, Bogotá, Ho Chi Minh City, Dongguan, Chengdu and Hyderabad all have populations of over 8 million inhabitants, and it looks like they will reach megacity status by 2030.

If half the world's population come to live in cities, it is clear that cities will have a huge impact on the world's emissions and use of resources.

Worldwide sustainability challenges include questioning how sustainable and smart the megacities are. If half the world's population come to live in cities, it is clear that cities will have a huge impact on the world's emissions and resources. At the same time, megacities offer a good platform for truly systematic thinking, such as seamless traffic.

For example, the widespread floods in Lagos 2012 pushed the city to develop its water supply management systems. The floods have been dammed by the Eko Atlantic initiative, an island city being developed just outside Lagos to prevent the erosion of the coastline and flooding. Prone to extreme natural phenomena, Dhaka aims at cleaner brick-burning through different programmes that could cut down urban pollution by almost 40 per cent, and related deaths by 40 to 60 per cent. The greatest difficulty with the programmes has been poor administration. A positive example is found in China's Shenzhen, where car pollution is being reduced through green public transportation. Shenzhen currently has over 1000 electric buses and 500 electric taxis. In addition, drivers of electric cars receive incentives and the city aims to switch completely to electric buses and taxis by 2016. Shenzhen is one of 13 cities in China at the forefront of green traffic.

The solutions are already in our hands

The sustainability crisis has many challenges, but also many possibilities. Climate change can be solved, and the solutions can offer extensive opportunities for advancing well-being, work and development, as long as these opportunities are grasped.

It is easy to imagine how climate change and the sustainability crisis could require accelerated innovation processes. But a factor often left unacknowledged is the collection of tools already available for scaling down emissions and significantly cutting down resource consumption.

Technology alone is not enough. People and societies are at the core of everything. Even the best technology does not advance the situation if it is not harnessed. Great opportunities currently include proven good practice, carbon neutrality and resource-smart solutions. The rest is up to people.

Making use of existing best practices

Published in the run-up to the Paris climate conference, Sitra's Green to Scale report presented 17 best practices already in use to cut down emissions. The intention was to show that no new technology or policies are needed; the task is only to put these examples into practice. The results were startling. The 17 examples alone could decrease carbon dioxide emissions by nine gigatonnes (billions of tons) by 2025, and as much as 12 gigatonnes by 2030. The nine gigatonnes would amount to the total of emissions produced by the USA, Mexico, Canada and Central America combined. The next level – 12 gigatonnes – would include China's and Japan's emissions, or a quarter of all global emissions.

It must also be noted that by including technologies and solutions already in use, the impacts would be far greater. Secondly, the results only include the duplicating of these examples until 2030. Pioneering cleantech countries can go much further than this, at a faster pace. Future innovations also bring about enormous potential.

Climate change can be solved, and the solutions can offer extensive well-being, work and development, as long as these opportunities are grasped.

The existing solutions presented in the report concern the fields of energy, transport and logistics, construction and households, industry, agriculture and forestry. The biggest impacts come from solutions focusing on renewable energies, forest protection, energy efficiency in industry, domestic solutions and car efficiency.

The most interesting solutions for wealthy countries are the ones cutting down household emissions, as well as forest enhancement and protection. Countries of mid-level income can find interesting solutions in industry and car efficiency.

Poorer countries are advised to look into decreasing logging and using better cooking stoves. Solar and wind power offer interesting potential for all countries.

The practices presented in the report would mean a situation where emission reduction would not mean costs, but rather savings in the long run. The estimated median in annual net costs is 18 billion euros by 2025, and 38 billion by 2030. Many low-carbon solutions follow the same formula: they require large front-loaded investments, but generate great savings in the long run. Low-carbon solutions will become much more cost-efficient with time, which challenges the viewpoint that reducing emissions would be a costly effort. As an example, solar panels can cut energy costs by 80 per cent in five years. The report's solutions have partly been selected for their cost efficiency.

Carbon neutrality offers tremendous new business opportunities

Carbon neutrality offers great opportunities for new business, and the recently agreed Paris climate agreement is a huge leap forward. A central question in the decoupling of

economic growth and emissions is, how can companies can make low-carbon solutions into a strategic competitive source and what are the scales of global opportunities?

Sitra and the international consultancy firm Frost & Sullivan published a megatrend analysis examining the most relevant megatrends for Finland, their impacts and opportunities surrounding carbon-neutral business within energy, water, waste management, mobility, construction, industry and the bioeconomy. According to the analysis, carbon-neutral business opportunities in these fields can open up enormous markets. The market analysis concludes that carbon neutrality can create a 6,000 billion euro market for smart green solutions by 2050.

The biggest potential for growth is found in smart city infrastructure, opening up an annual 1,500 billion euro market in the next five years. The strongest growth is to be seen in smart mobility solutions: smart transportation systems and self-driving cars could build up a global market worth 3,400 billion euros annually. According to Sitra's recent report, Finnish export of clean solutions in the energy and transportation sectors alone will add up to about 5 billion euros annually by 2030.

The next big step is the scaling up of best practices.

In addition, smart waste and water supply management systems, materials and packaging, as well as production systems form an annual market of 670 billion euros. Finland has an excellent opportunity to produce smart city solutions in, for instance, energy efficiency, the circular economy and clean transportation solutions such as bio fuels.

The most relevant megatrend drivers of carbon-neutral business are the following.

Climate change. In order to stem the increase in global carbon emissions, business models will need to evolve to embrace low- and zero-carbon technologies, improve energy efficiency and promote the circular economy to eliminate waste.

The future of energy. The energy sector will need to decarbonise, meaning widespread deployment of clean technologies, supported by cost-effective storage, and business models that drive greater energy efficiency. The renewable energy market is forecast to account for over 40% of the global energy mix by 2050, amounting to an annual market of 800 billion US dollars.

Smart is the new green. The market for smart cities will reach a phenomenal value of 1.6 trillion US dollars globally by 2020 and by 2026 there will be 26 smart cities, half of which will be in Asia. Green products and services will be increasingly enhanced and traditional products replaced by smart products and services to ensure low-carbon growth.

The future of mobility. More than two billion light duty vehicles are expected to be on the roads in 2050, an increase from 900 million today. A smarter and highly integrated transport network, powered largely by electricity and low-emission fuels is vital for curbing future emissions growth.

Urbanisation. Half the world's population lives in urban areas. This will increase to around 70 per cent by 2050, transforming cities into enormous economic hubs and creating the phenomenon of megacities. Megacities will account for 21 trillion US dollars of

the global GDP (nominal) by 2020. Partnerships between city governments, solution providers (businesses) and academia will become the working model for most future city projects which are vital to ensuring that this growth is not matched by proportional increases in carbon emissions.

The future of infrastructure. Global investment into infrastructure development is expected to surpass 27 trillion US dollars by 2025, with Asia-Pacific (APAC) accounting for a 37 per cent share. Green construction materials, linked to circular use of material from existing buildings, will be part of crucial low-carbon development.

The circular economy redefines the material life cycle

The circular economy is a cure for excessive waste. Material loss and waste are minimised. In a circular economy, the use of resources and materials has been streamlined so raw materials and their value stay in the cycle. In practice, this means that a product might be designed in a way that makes it possible to deconstruct it and recycle the separated materials. Sitra's report on the circular economy found that the circular economy could bring a 1.5 to 2.5 billion euro opportunity for Finland. In spite of its small size, Finland has a good starting point to make it in international competition: high education levels, strong technological know-how and a good reputation in the cleantech industry could lay the foundations for success.

The biggest value potential of the circular economy is not in material flows or waste. Product maintenance, reuse and reproduction are all more valuable business opportunities. The basis should be the circulation of value and the prevention of waste, not so much maximising the repurposing of waste as raw material or energy.

Finland has already come a long way with circular economy practices in several fields: energy efficiency in the paper industry, bottle recycling, flea markets and product modularity are all good examples. The Technical Research Centre of Finland (VTT) has significantly advanced the reuse of textiles.

A lot remains to be done, however: 54 per cent of waste is left unrecycled, and Finland has yet to see new innovative service concepts addressing, for example, appliance maintenance, reuse and reproduction. There are exemplary practices around the world that could be localised, such as one of the world's biggest carpet producers Interface, who lease carpets to companies. After use, the carpets are returned to the factory as raw material for new carpets. Similar business models have been created by companies like Rolls-Royce, BP, elevator giant Kone and Kemppi, a leading manufacturer of welding machines whose business focus is in bringing machinery and operators directly onto construction sites instead of selling them.

Important features of the circular economy are ambitious visions and wide collaboration, with companies, municipalities and cities, households and administration as central players. Everyone's effort is needed to facilitate the systemic change at hand. Information, practices, streamlined administration, business know-how, experiments, pilots and networks are all needed, as well as responsibility, innovative thinking and enthusiasm. Sitra is advancing the circular economy by building a road map together with collaborators, by finding suitable business models, and by trialling encouraging administrative practices.

Technology does not override the importance of human action

Technology and the global climate agreement are not enough if people do not participate in these efforts. Human action is at the core of all development.

The 2015 Climate Barometer showed that close to 70 per cent of Finns are concerned about climate change, and that 57 per cent have channelled their consumption habits in a more sustainable direction in the past six months. Although there is often a gap between answers and action, it must be noted that clean and smart consumer products have become more competitive in comparison to traditional products. The prices have come down due to energy savings in production, and the group of consumers making sustainable choices is constantly growing.

Consumers born after the 1980s are more used to thinking that using a product is more valuable than owning it. This trend also includes quick and easy availability, digital and mobile access to products and services, and flexible consumption. Many smart and clean solutions tend to emphasise collective consumption and use, which offers an alternative to traditional mass production and owning. On the other hand, a slow economy and growing unemployment also affect consumption practices. Many forms of sharing, exchange and collective use are also a sound option to owning. An interesting trend is also personal energy production, and selling surplus energy to others, or sharing one's own goods in order to generate additional income.

Digitisation makes on-demand services easier, which is a smart way to cut down on transportation emissions. The MaaS (Mobility as a Service) solution currently being developed in Finland is based on the inter-linking of taxis, buses, trams and cars into one joint platform that streamlines mobility and reduces emissions. Any new model must be devised in a way that offers easy, simple services for users that are also more attractive than unsustainable solutions, such as private cars.

In the circular economy, the use of resources and materials has been streamlined so raw materials and their value stay in the cycle.

The described situation is also valid for other consumption practices. New solutions and services are adopted if they make the everyday things easier and are priced attractively. The think tank Demos Helsinki and the Finnish Funding Agency for Innovation Tekes believe that Finland should create two to three world-class impact accelerators in order to get Finnish companies to embrace the consumer cleantech market. Capital investments should be increased in the field and Finnish companies should actively seek partnerships with the world's biggest consumer cleantech players, for example in the fields of smart construction and mobility.

The individual's role in the carbon footprint is big. The Envimat study conducted in 2009 showed that domestic households account for 68 per cent of the Finnish carbon footprint. The personal carbon footprint of Finns is among the biggest in the world.

Consumer choices can significantly dampen climate change, because they also direct the private sector. When companies see a growing demand for competitive

low-carbon products and a reduced demand for high-emission ones, there is a pressure to support the demand at hand. Everyday choices affect climate emissions more than we might think. Supporting local low-emission solutions also supports local industry and employment.

There is still a lot of room to steer the course of business management, politics and a general consciousness about one's own choices. Sustainable lifestyles are the sum of many parts; consciousness, peer behaviour, the availability of goods and services, prices, incentives, taxation and comfort. It is clear that technology alone is not enough, but all sound decisions involve a human choice, whether it is an individual, a family, a leader or a politician. Different levels have different impacts, and the sustainability crisis cannot be defeated without behaviour change. There are, however, many positive signals of change, and it is worthwhile strengthening them.

Is the sustainability crisis a motor of multilateral global politics?

Global politics has recently witnessed a difficult period, with, for example, war in Syria, troubled relationships between the West and Russia and unrest in the Middle East. The sustainability crisis has been a driver of multilateral global politics. The Paris climate agreement shows the power of multilateral collaboration. The ambitious aims to cut emissions and the legally binding agreement are the most noteworthy decisions in a quarter of a century.

Many smart and clean solutions tend to emphasise collective consumption and use, which offers an alternative to traditional mass production and owning.

There are many reasons for the success of the agreement. Technological advancement plays a leading role as low-emission solutions have truly started to become attractive for both nations and companies. The Breakthrough Energy Coalition was also an important player in the Paris climate discussions as a joint private sector initiative to develop clean-energy technologies. A similar commitment was made by countries in the form of the Mission Innovation initiative. In addition, the Indian-led International Solar Alliance for furthering solar power in tropical nations was an important background force in the negotiations. The participation of these different ventures was important in ensuring the participation of new actors, developing nations and companies as a complementary force to more traditional international negotiations.

Important points in the Paris Agreement include the following. Firstly, the agreement sets a goal that is ambitious enough to restrict climate change. The aim is to keep global warming below the two-degree risk limit. There was also the reminder that staying within a limit of 1.5 degrees would be even safer. Secondly, the agreement involves all countries. The agreement obliges every country to report on their own commitment to reduce emissions. Nobody has to fear being left alone.

Answering to the sustainability crisis is a counter-force to global politics in the cold breeze of geo-economics.

Thirdly, the commitments are evaluated and can be checked regularly and in good time. New commitments must be tighter than previous ones, and any country can announce a more ambitious aim at any time. Climate efforts can then be speeded up in the coming years in a way that brings us closer to sustainable levels of emissions. Fourthly, the Paris Agreement ensures an adequate financing for the climate work of poor nations. The annual 100 billion dollar support can form a baseline to raise the level in the next decade.

The Paris climate agreement is a significant step in multilateral collaboration. Answering to the sustainability crisis is a counter-force to global politics in the cold breeze of geo-economics. Time will tell, but an important step has been taken.

Solutions for climate change and the smart use of resources generate positive additional impact

Employment. Renewable resources can generate significant local employment and export. Solar energy alone has created 115 000 jobs in Bangladesh. Energy-efficient construction employs 400 000 people in Germany.

Better competitiveness. Energy-efficient industry can boost competitiveness and enhance energy security. The circular economy is seen as a 2.5-plus billion euro opportunity for Finland.

Reducing pollution and traffic. Sustainable mobility can significantly reduce urban pollution and traffic congestion.

Health impacts. Introducing efficient cooking stoves in China and developing nations has noticeably reduced household emissions, and also advanced women's health.

Cheaper driving. Vehicle energy efficiency is also visible in fuel costs, improves air quality and has an indirect, positive impact on human health.

Cheaper food. By cutting down food waste, the price of food has come down, for example through food sharing.

Clean air and arable land. Smart agriculture supports arable land and valuable water supplies.

Better living environments and the survival of species. Forest protection maintains a carbon sink, and helps the survival of species and the preservation of habitats for indigenous populations.

Source: Benefits of Carbon Neutrality in a Rapidly Changing Business Environment, Sitra 2015

Sustainable lifestyles break through

The future will see us sharing more spaces, commodities and tools with our neighbours. Societal structures support sustainable lifestyles in mobility, housing and food. A current of warm air floats into the kitchen a moment before our alarm clock rings in the bedroom. The temperature at home fluctuates according to comfort and the use of different spaces. At night it drops to ensure deep sleep, and in the morning the kitchen's room temperature is up again while we prepare our morning coffee. Stepping out of the house, we glance at an application linking all possible private and public mobility connections to find the quickest route to work. Great! My ride of the day is here already! Today I end up car-pooling in my neighbour's electric car halfway, and continue by tram to arrive right at the office doorstep.

Our consumption habits have changed significantly. Every decision on well-being, food, housing and mobility takes into account the planetary carrying capacity. The sustainable option is also the easiest and cheapest. Unsustainable and environmentally harmful choices have become more difficult to make. It is more economical to recycle construction waste than to dispose of it.

Finland has recently witnessed a self-reflective discussion on lifestyles and the impact of our daily choices. Shifts in attitudes and values are reflected everywhere from lunch restaurants to sports events. Both business and politics root for sustainable well-being.

Our close ones and peers have an important part to play in adapting a sustainable lifestyle. When a smartphone application informs us that our neighbour is consuming less electricity and water, we instinctively try to shift our behaviour to match our neighbour's. It is important to realise what factors motivate us towards sustainable consumption. Someone recycles to keep the planet healthy, another one recycles their metal cans because it brings savings in the waste-management bill. Or does someone still know a smoker who is not aware of the negative consequences of this habit?

Many apartment buildings have shared laundry rooms and saunas, and shared kitchens and sharing systems are becoming more common. More and more people wish to borrow an item when needed, instead of buying it. It is easy to sell, borrow and exchange items on different online platforms and in social media groups. The sharing economy does not reduce our standard of living. People borrow, rent, exchange and recycle items like they do with ideas or skills. The consumption of natural resources and energy decreases, and communality becomes a value in apartment houses and neighbourhoods naturally.

The sharing economy has a lot of potential for business, as is seen in the cases of Airbnb and Uber. It is important that governments re-evaluate policies that might restrict the new business practices of the sharing economy. It is just as important to examine the potential negative consequences, and ensure workers' rights in new-era companies.

Source: www.uusijuoni.fi, Sitra 2015

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