



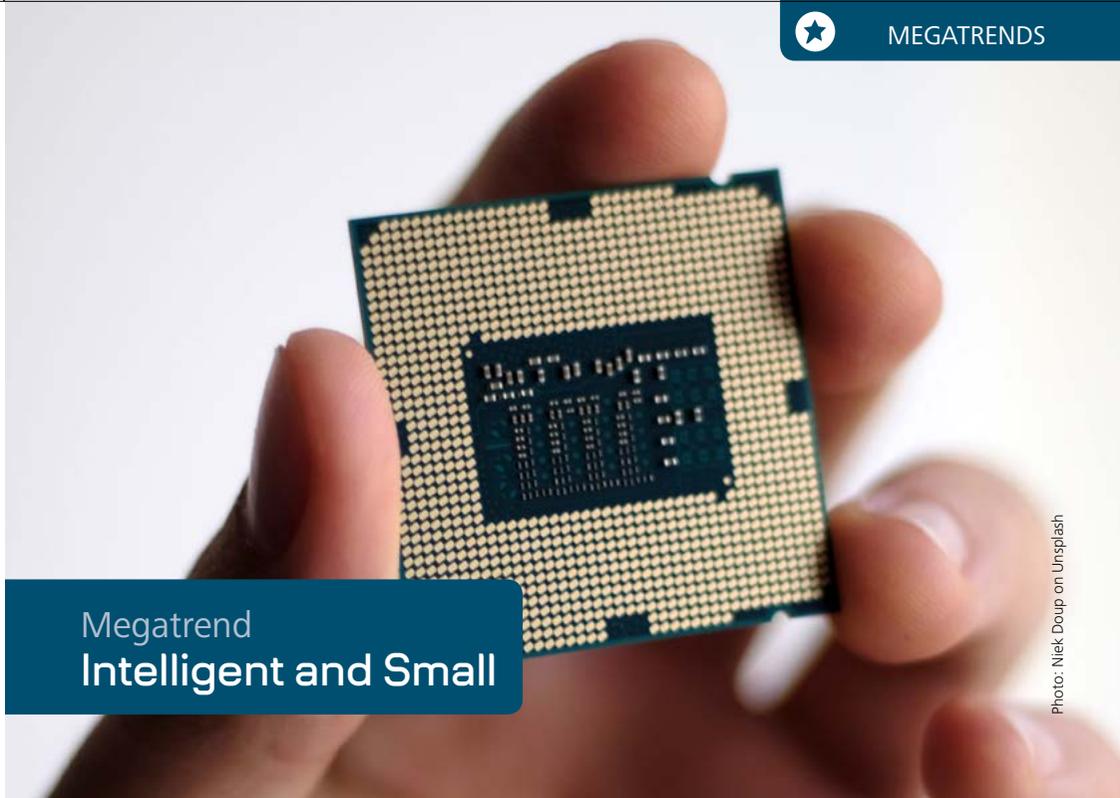
Megatrend  
**Urbanization**

Photo: Andreas Brucker on Unsplash



Megatrend  
**Scarce Raw Materials**

Photo: Roberto Scrin on Unsplash



Megatrend  
**Intelligent and Small**

Photo: Niek Doup on Unsplash



Megatrend  
**Renewable Energies**

Photo: Hilde Marouschek



## Scarce Raw Materials

*Without phosphorus, modern agriculture would not be possible. Without rare resources, there would be no cell phones or computers, and without oil, hardly any plastics. By 2050, some important raw materials will only be available in small quantities.*

Stone Age, Bronze Age, and Iron Age: the epochs are named after the respective raw materials that humans discovered and figured out to use. 250 years ago, people began extracting coal and, even later, crude oil to generate energy. The problem: once consumed, they are irretrievably gone. Global demand for raw materials has almost doubled since 1970. Consequences of the excessive consumption of resources include climate change, extinction of species (animals, plants), poor air quality, and contaminated soils, with a wide range of negative consequences, (including social ones) that must be coped with by the entire world. Many of these negative consequences occur increasingly in countries of the Global South and affect people who are not causally responsible for them. Or they occur only after many years when the people responsible are often already dead.

### *Possible Impact of the Megatrend*

There may be disputes or even wars over raw materials and costs of scarce resources, and thus, the prices of end products may also rise. On the other side, the scarcity of raw materials may amplify the search for alternatives: renewable raw materials or continuous cycles in which all raw materials are obtained from existing products or their waste (keyword: circular economy).



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## Renewable Energies

*By 2050, up to 70% of the energy we need will be produced from sunlight, wind, and hydropower. Most power plants are small. Since wind and sun are not available at the push of a button, energy storage is very important.*

In the past, people used only renewable energy: wood for heating, wind and water for grinding flour, or animals for transportation. Around 250 years ago, that changed. The steam engine was invented, and people started to use fossil fuels such as coal and oil on a massive scale. The term "fossil" comes from the fact that these energy sources were created millions of years ago. Extracting and burning fossil fuels such as oil, coal, and gas pollutes the environment and triggers climate change. Moreover, they are not renewable, and quantities are therefore limited. In the future, fossil energy sources will no longer be used. Energy will be produced from sunlight, wind, hydro, biomass, and perhaps entirely new clean energy sources. A significant proportion of the renewable energy that is consumed will be produced by consumers themselves.

### *Possible Impact of the Megatrend*

All people have access to clean (renewable, environmentally friendly) energy. Industrialization drives the standard of living higher. The environmental impact of energy production and consumption decreases. However, the landscape is also changing, for example, due to wind farms and solar parks.



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## Urbanization

*By 2050, more than 80% of the world's population will live in a city. The number of people living in rural areas is therefore becoming smaller and smaller. This phenomenon is called „urbanization.“*

Even 2000 years ago, people built settlements that developed into cities. In the past, many cities were surrounded by a wall or a moat to protect it's population from enemies. Today, many people move to a city for work or study. Cities are attractive because everything is available and easy to reach: shopping facilities, leisure activities, hospitals, schools and universities, and public transportation. In 1950, only about 30% of the world's population lived in cities, and by 2015 the share increased to 53%. According to current forecasts, by 2050, more than 83% of all people will live in cities. The so-called „rural exodus“ is particularly high in poorer countries, but urbanization is also evident in wealthy countries of Western Europe, for example.

### *Possible Impact of the Megatrend*

Rural areas are increasingly depopulating and are therefore less attractive, especially for young people. Urban areas are under pressure: affordable housing, increasing traffic, climate change adaptation, overtourism, and much more. On the other side, many people long for peace and to experience nature as untouched as possible and move to suburbs around metropolitan areas.



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## Intelligent and Small

*The year 2050 will be teeming with tiny machines. Small implants are inserted in our bodies to monitor our body functions. Intelligent fibres transform clothing into all-weather protection. Artificial life forms produce food and recycle waste.*

Ever since humans started building machines, they have been trying to make the devices smaller and smaller. Computers used to take up entire warehouses, but today they fit in any pocket. Pocket watches and wristwatches took over the function of church clocks, tablets took over the function of libraries, and smartphones took over the one of personal computers. Small is practical: small things are easier to transport and often cheaper to produce. But the smaller something gets, the more precise the manufacturing process has to be. Many devices could never be produced by hand and are therefore built by robots.

### *Possible Impact of the Megatrend*

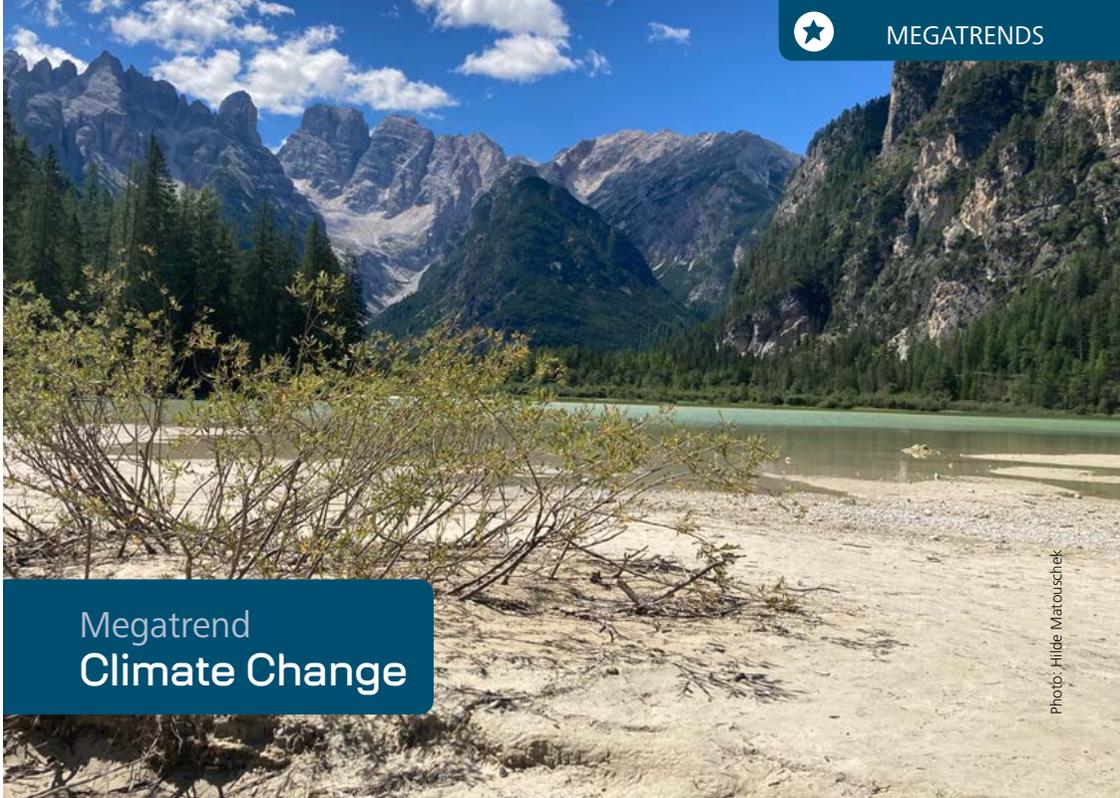
Machines are doing many jobs previously done by humans, and for which it was difficult to find workers. Innovative technological developments solve some problems but produce new ones, not only regarding the collection and use of data (keyword "data protection"), but actions that can be controlled externally via implanted microchips. In return, the "little helpers" do a lot to help us and can "nudge" us to more sustainable and healthier lifestyles (keyword: nudging).



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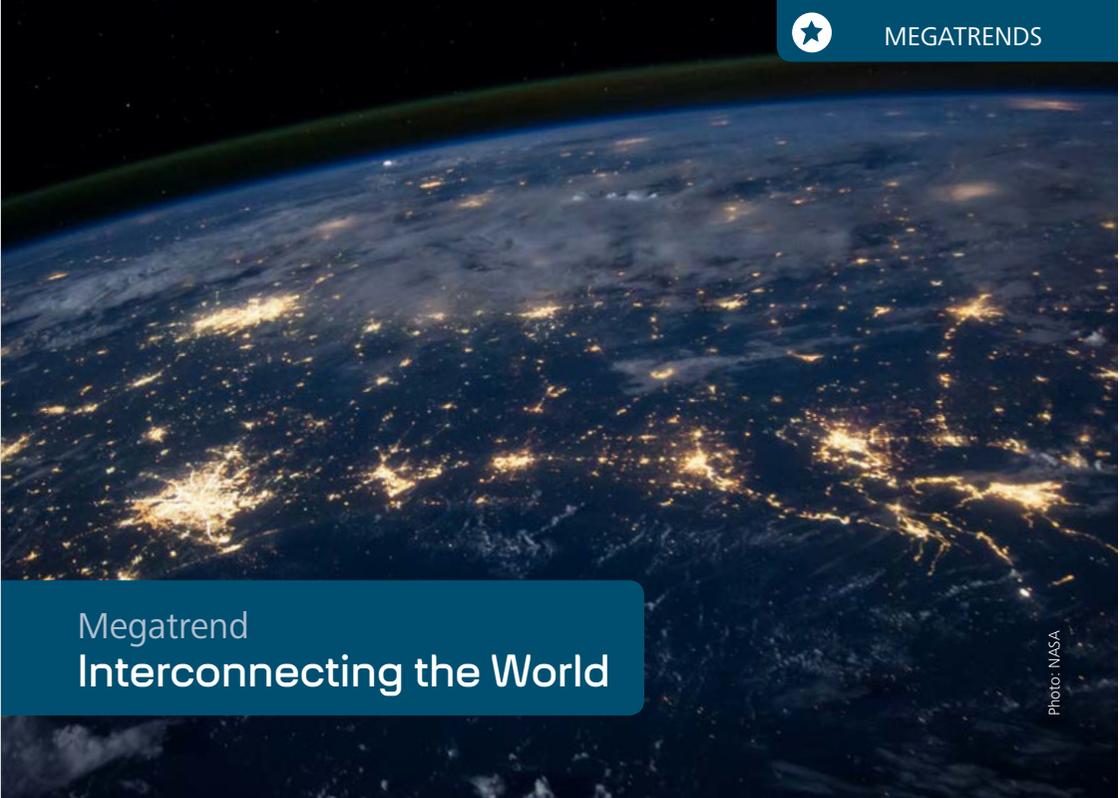


Megatrend  
**Climate Change**

Photo: Hilde Matouschek



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Megatrend  
**Interconnecting the World**

Photo: NASA



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Megatrend  
**Technological Progress in Africa and Asia**

Photo: Gisun Mall



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Megatrend  
**Artificial Intelligence**

Photo: Andy Kelly on Unsplash



## Interconnecting the World

*By 2050, the world moved closer together. Fast internet is available anywhere in the world. Information is shared worldwide. Traveling to other countries is part of one's everyday life. Comparative cost advantages are utilized: the production process of many products takes place in many countries, and products look back on a long journey before reaching the consumer.*

People are explorers. Whether Marco Polo, Christopher Columbus, or Maria Sibylla Merian: humans have always been interested in discovering the world and gathering new knowledge. New inventions such as sailboats, railroads, airplanes, and rockets made it possible to reach more distant destinations. But, the farther the options to travel, the greater the distance to friends and relatives. Without communication, world travelers are far removed from their social networks back home. Communication with acquaintances and relatives was and is important: in former times with letters, then telegrams followed by telephones, and finally by using the World Wide Web. Travel and communication are inseparable. The world has become a village with many neighbors.

### *Possible Impact of the Megatrend*

With the World Wide Web, everyone in the world can communicate with each other quickly. Traveling even to distant destinations can be afforded by most people in the Global North and a considerable proportion of people from emerging countries. Technology enables virtual travel, e.g., to find out if the destination is what you are looking for.



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## Climate Change

*By 2050, the earth will be 2° Celsius warmer on average, with a rising tendency. Sea levels will rise, and storm surges and droughts will occur more frequently. Many animals and plants will be extinct because they are not able to adapt fast enough. Many people have to flee.*

The earth's climate has always been in a state of change. In the last 70 years, however, humans have tremendously increased the speed of change due to global economics and lifestyles. With increasing industrialization and development towards a "consumer society," the consumption of fossil energy sources such as oil and coal and the emission of climate-damaging gasses (CO<sub>2</sub>, methane ...) started to rise and still does. Animals, plants, ecosystems, and people are (partly) not prepared to manage the adaptation, and consequences might be severe and partly irreversible.

### *Possible Impact of the Megatrend*

Extreme weather events increasingly occur as well as damages like mudslides, floods, etc. Some regions become uninhabitable, and new perspectives arise in other ones. People whose land becomes uninhabitable are forced to flee. Global warming particularly affects vulnerable groups, e.g., the elderly. Flora and fauna are changing: creatures that did not previously exist in our latitudes are suddenly appearing, and others are dying out. New types of fruit, grains, and vegetables might be cultivated. Old business models no longer work, and new ones come up ... In tourism, both supply and demand will change with regard to space and time.



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## Artificial Intelligence (AI)

*By 2050, many things will work without humans: cars will drive by themselves, computers will diagnose diseases, robots and drones will distribute mail packages, and digital avatars will teach children at school.*

The first modern computers were developed about 85 years ago. Computers were huge and required entire warehouses. Since then, the power of computers has doubled every two years, and at the same time, their size has steadily decreased. Today, computers are small and cheap, and they are used all over the world. A lot of research and development is going on in the field of Artificial Intelligence (AI). Today, for example, robots can already build other robots. But computers remain specialists and are only good at one thing at a time. However, a robot that can learn very different things similar to a human being is still only science fiction, even if computers learn and develop supported by AI.

### *Possible Impact of the Megatrend*

A computer can be built into any device. Many devices can do things on their own, learn new things, and even make decisions. This technology is convenient for humans but also poses the risk of abdicating responsibility through having computers make decisions that are negative for humans and the environment. As soon as computers can rebuild and improve themselves, humans – from computers point– could become obsolete.



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## Technological Progress in Africa and Asia

*By 2050, most of the countries in the world will be industrialized. There will be large factories where machines support people at work. More and more products can be produced and sold, and pollution will increase.*

Technological progress never remains limited to a particular region. Industrialization originated in England and quickly spread throughout Europe. Countries in Western Europe copied inventions like the steam engine and developed them further. The new inventions lead to prosperity, many became rich, the standard of living rose, and people had to work less and could pursue leisure activities. Life expectancy rose. Today, similar developments can be observed in China, Mexico, or South Africa. Education is a key: since only well-educated people can operate and further develop machines, countries with a poorly educated population remain excluded from technical progress.

### *Possible Impact of the Megatrend*

More and more products are being produced and consumed worldwide. Production requires a lot of energy and other resources, which damages the environment. On the other side, jobs are created: every job in an industrial company creates an average of approximately 2.2 jobs in other sectors. Prosperity increases, people can afford more, and infrastructure (education, health care, roads, etc.) is expanded.



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New Professions



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Megatrend  
Growth and Aging of the World Population



## New Professions

*By 2050, skills like creative thinking, working independently, and personal responsibility will be required at work. Simple tasks such as driving a car, delivering parcels, or making phone calls in a call center will be carried out by robots and computers.*

With every innovation and trend, new professions emerge while old ones disappear. With the car, the auto mechanic came and the blacksmith disappeared. With letterpress printing, the profession of printer came and copyists became unemployed. Labor costs money. If a machine can produce something cheaper than a human being, that person's profession disappears. This development primarily affects professions that can be easily replaced by automation, e.g., repetitive activities. For example, Artificial Intelligence may be able to answer telephone calls, or a robot may assemble entire cars. Knowledge work and care work are therefore becoming increasingly important. Jobs of the future include programmer, designer (of products, services, lifestyles ...), nurse, mentor, or trainer.

### *Possible Impact of the Megatrend*

A lot of work will be done by robots and computers. People need skills like creativity, empathy, and a high degree of flexibility and autonomy for pursuing their jobs. New professions that we cannot yet imagine are emerging. People need to be prepared to be able to act and decide proactively.



## Growth and Aging of the World Population

*By 2050, more than 10 billion people will live on planet Earth. That is 2 billion more than today. In addition, people will become older and older. The average age will rise from 30 (today) to 36. In the EU, 37% of people will be over 60.*

In the last 50 years, the world population has doubled. Growth is particularly strong in Africa, Asia, and Latin America. The main reason for this population explosion is technological progress. Modern agriculture makes it possible to feed more and more people. Hygiene, vaccinations, and good medical care are protecting more and more people from death by disease. In addition, numerous machines are taking over physically difficult and dangerous tasks and relieve people.

### *Possible Impact of the Megatrend*

Older adults form the majority in society in the Global North, young people in the Global South. Overall, there are many more people. This creates new challenges and questions: Is there enough space, work, food? How do people live together? How might we create a good life for all in the context of limited resources?

