Megatrends 2040

HELLENIC REPUBLIC
Presidency of the Government
Working Group on Strategic Foresight and Futures Research

Volatility, Uncertainty, Resourcefulness

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themes

Introduction

This summary report presents some critical megatrends and trends that concern the global community. Many of the megatrends presented here, are found in the European Commission's Megatrends Hub[1] or other sources of recognised standing in procedures of Horizon Scanning. In addition, the simple method of the Futures Wheel, which can be used by public institutions as a first step in understanding the interconnection of upcoming changes and challenges, is set out in Annex I (Glenn, 2009)[2]. Two of these megatrends are simultaneously cited by many analysts as forces of change and refer to **globalisation** and the **evolution of technology**[3].

Together they shape economies, societies and our lifestyle. In both developed and emerging economies, the slowdown in growth, the increasing inequalities and the deepening fractures in the social contract are creating upheavals and instability. However, it is perhaps the right time to mobilise all the new means available to humanity. Empowering and unleashing human capabilities could help face the challenges ahead and create a new socio-economic system that provides trust and opportunities for all.

The important themes that occurred from the analysis of these megatrends can be summarised in the five points below:

T01

The analysis identified **global challenges** such as **climate change**, potential financial crises, **pandemics** and **implications of exponential technological developments**. These challenges (eg. Covid19) -often not directly dependent on the human factor- will bring about extensive pressure and significant impact on countries and societies.

The effects of climate change and environmental degradation are likely to affect food and water availability for poor countries, intensify migration, cause new health challenges and contribute to biodiversity loss.

New technologies will emerge and will spread faster, disrupting the economy, the labour market, society itself and the citizen's position in it.

The continuing effects of climate change exacerbate inequalities and intensify the phenomenon of climate migration globally, creating constantly new problems in both the countries of origin and of destination. The above challenges, if combined, will in turn affect other parameters, with implications that are extremely difficult to assess.

themes

T02

Facing the above common challenges is getting more difficult, partially due to the growing **fragmentation** of societies, states and the international system. Surprisingly, despite the fact that the world is more interconnected than ever before through globalisation, this interconnectivity may have contributed to the fragmentation and radicalization of people and communities. The hyperconnected information environment, the intensification of urbanisation and the interdependence of economies signify that most aspects of the daily lives of the citizens, no matter where in the world they live, are closely interrelated.

«Internet of Things» connected devices reached 23.14 billion in 2018 and are expected to reach 75.44 billion by 2025 and possibly many trillions by 2040[4], all of which will be monitored in real time. This connectivity will enable the creation of new skills and facilitations and will also help raise the standard of living. However, this will create tensions at all levels from societies that are being divided as they differ in core values and goals, to regimes that use digital repression to control their citizens. As these hyper-connections deepen and spread, it is likely that in parallel social, cultural, or political preferences' fragmentation will increase.

In addition, people may come together and share information with others with similar views, reinforcing specific beliefs and a sense of owning the truth. Meanwhile, globalisation is likely to continue to prevail but also to change form as economic production networks shift and diversify. Overall, these forces depict a world that is inextricably linked, but at the same time fragmented.

T03

The extent of common challenges and the emerging effects of fragmentation go beyond the ability of the existing systems and structures to respond and create **imbalances**.
There is a growing mismatch at all levels between challenges and needs on the one hand, and the systems and organisations that aim to address them, on the other.

The international system -including organisations, alliances, and rules- does not seem ready to meet the increasing global challenges populations are facing.

The COVID-19 pandemic has been a prime example of coordination failures in handling health crises on a global level as well as of mismatches among existing pandemic response mechanisms, funding levels and future health challenges.
A constantly increasing gap between what citizens demand and what governments and the private sector can offer is likely to be created and established within states and societies. All over the world without exception, more and more people are taking to the streets to express their dissatisfaction with the inability of governments to meet a wide range of needs and expectations.

As a result of these imbalances, the existing systems -from institutions and rules to forms of governance- seem to have reached the limits of their potential, while there appears to be an inability of those in charge at all levels to agree on new governance models.

themes

T04

A key consequence of this great imbalance is the creation of a greater **conflict** within the communities, the states and the international community, including the growing tensions and competitions.

Relations between societies and governments will be under constant pressure while states will strive to meet the growing demands of citizens. As a result, domestic politics is likely to be more unstable and questioned. No country, ideology or system of government seems to meet the demands of the citizens. On a global level, the geopolitical environment will become more competitive mainly because of the China challenge to the United States and its allies.

The major powers have engaged in a rally to set the rules of the new direction. This competition takes place in all sectors and topics, from communications, information flow and media to trade and technological innovation.

T05

Finally, the need for **adaptability** will be imperative, making it an advantage for all. Climate change, for example, will force almost all states and societies to adapt to a warmer planet. Some measures are cheap and simple, such as reforesting or storing rainwater. Others are more compalicated, such as constructing huge sea walls or relocating large populations.

Demographic change will also require broader adaptation efforts. Countries with a high percentage of senior population, such as China, Japan and South Korea, as well as Europe, will face constraints on economic growth should they not implement adaptive strategies, such as increasing the use of automation and adopting a flexible immigration policy.

Technology can be key to gaining advantages through adaptation. For example, countries that are able to take advantage of the productivity growth resulting from artificial intelligence (AI) will “seize” economic opportunities, which could allow governments to provide more services, reduce national debt, finance part of the cost of the ageing population and even help some emerging countries avoid the «middle-income trap» (loss of strategic advantages).

The benefits of technology will be unequally distributed across and among states and, more broadly, the adaptation process is likely to reveal and exacerbate new inequalities. The most effective states are probably the ones that can build social consensus and trust in the collective action for adaptation and at the same time leverage the relevant know-how, the capabilities and the relations between the public and the private sector.

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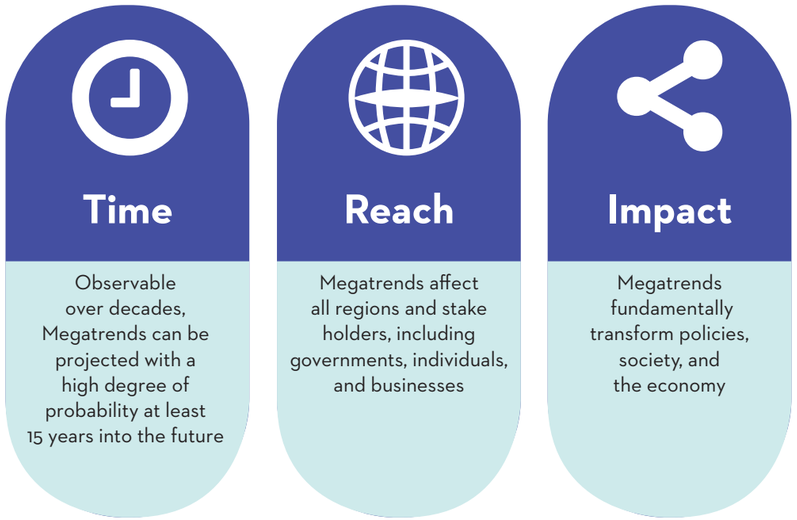
Volatility, Uncertainty, Resourcefulness

Global Megatrends

Megatrends are defined as long-term driving forces that are observable now and will most likely have a global impact. They can help you identify probable and preferable futures. Use them to reflect on the future in a systemic way[5]!

The term Megatrend was first mentioned by John Naisbitt in his book “Megatrends” (1982), where a Megatrend is defined as a long-term process of transformation with a global extend, wide scope and significant impact[6].

The three dimensions of megatrends



Graph 1: The three dimensions of a Megatrend [7]

The secondary research conducted, initially revealed about twenty megatrends and trends, often cited in published academic papers, foresight books, reputable strategic studies, in the media, and especially in The Megatrends Hub of the JRC[7]. Seven of these Megatrends, with a significant impact on the European and global economy, society and policies, have been selected[9] .

megatrends

M1

Megatrend 1

Climate Change demands ecological reform

The climate will continue to change even if all emissions from human activities suddenly stop. However, continued unabated anthropogenic pollution and greenhouse gas emissions will further increase global warming, ocean acidification, desertification and change climate patterns[10].

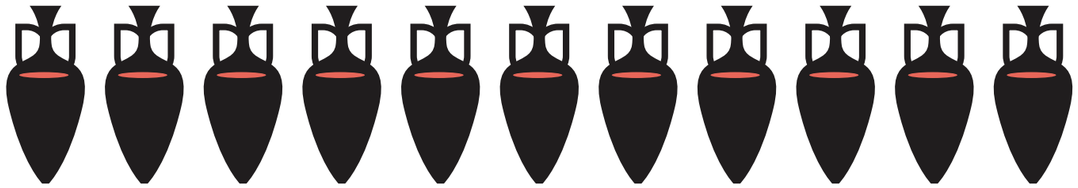
Pollution, overexploitation of natural resources and environmental degradation will lead to serious, irreversible changes for people, infrastructure, economies and ecosystems around the world. Greenhouse gas emissions and pollution are increasing, mainly due to economic development but also population growth. Meanwhile, biodiversity and resilience are in a continuous and sharp downward trend.

The visible effects of climate change are expected to intensify in the coming decades on a global level. Extreme weather events are becoming more common: continuous temperature increase, cyclones in countries such as Greece, sea level rise on a worldwide level, polar ice melting, droughts and frequent rains causing floods affect life safety, economic growth and the natural environment, and pose a threat to human well-being. Throughout history the climate has never stopped changing, however anthropogenic activities have a major influence on the rapidly changing climate.
Greece will be strongly affected (in sectors such as tourism, infrastructure, cities) by the rising global sea levels, rising at an average rate of 3.4 millimetres per year. Meanwhile, the volume of the Arctic ice reached a record low in 2018.

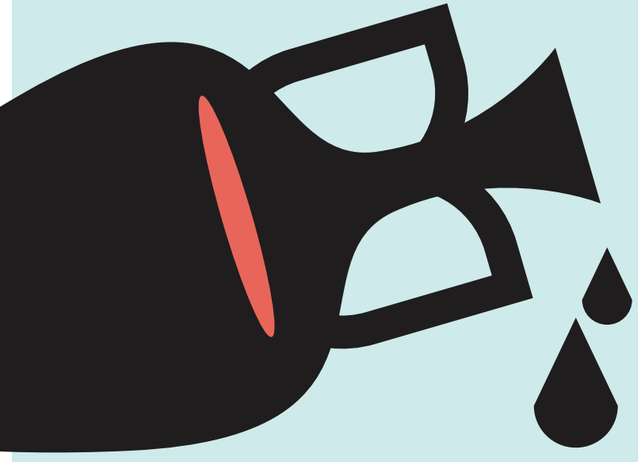
Antarctic ice melting rate has tripled in the last five years, and exposure to natural hazards has doubled in the last forty years, affecting more and more areas around the world.

Key Points:

- Food security
- Rising sea levels and stronger storms affecting coastal areas
- Lifestyle and health
- Immigration
- Growing financial losses impact public and private budgets and create debt
- Soil degradation
- Activism and participation



Megatrend 2
Resource scarcity



Global demand for all kinds of natural resources has increased tenfold during the 20th century and is expected to double by 2030, in comparison to 2010. Demand for water, food, energy, land, minerals and ores will continue to grow significantly, mainly due to the ever-increasing purchasing power of a growing middle class on a global level. Challenges in meeting demand are expected to be further exacerbated by climate change, thus natural resources will increasingly become more scarce and expensive[11].

Raw materials

Within the last 50 years the world population has doubled and the GDP has increased tenfold. The agricultural and industrial production have increased as well. As a result, the earth has been experiencing an ecological deficit since 1970. In 2019, the Global Footprint Network, a non-governmental organization, warned of the over-consumption of all the natural resources the planet could regenerate in that year. “Humanity is currently using the planet’s resources 1.75 times faster” than our planet’s ecosystems’ capacity to regenerate them, compromising the planet’s future regenerative capacity, underlined the NGO.

Energy

According to WWF, consumption of fossil fuels doubles every twenty years, which is a worrying rate given that their level is dangerously low. As the International Resource Panel of the Environment Programme of the United Nations warned, this dramatic increase in the use of non-renewable natural resources will exacerbate climate change, increase air pollution, and reduce biodiversity. It will ultimately lead to depletion of natural resources, causing a worrying shortage of critical materials such as minerals, metals and fossil fuels, whose reserves are finite.
The trend is expected to peak as emerging economies continue to grow and consume more. The growing use of materials per GDP unit will increase environmental pressure. This growing demand for materials may contribute to local conflicts, such as those observed in areas where mining competes with agriculture and urban development. Global capacity from all renewable energy technologies is growing significantly and supporting policies continue to spread around the world. If all economically viable solutions are pursued to improve the efficiency of renewable energy sources, total energy demand could be maintained at the current level for the next twenty years.
The share of renewable energy sources could increase to over 40% by 2040, from 25% today[12].

Water resources

The combined effects of rising demographic imbalances, increasing consumerism and continuing urbanisation will exponentially increase water demand, whereas supply will become more volatile and uncertain.
The reduction of available water resources from over-irrigation causes additional negative environmental effects.

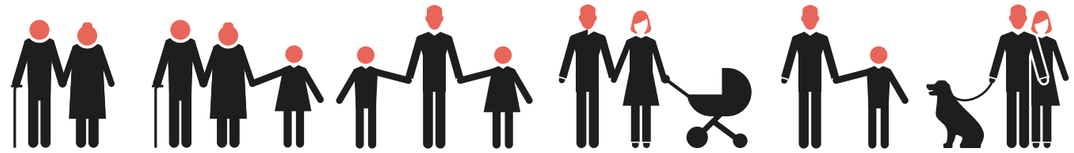
Today, it is estimated that almost 70% of the total water resources pumped from above-ground and underground reservoirs worldwide is spent on irrigation, whereas the relevant percentage in Greece reaches 80-85%[13].
A large amount of this water is lost through irrigation network leaks, while an equally large amount is wasted due to poor irrigation practices and lack of planning. The percentage of irrigation water spent on network leaks and over-irrigation ranges from 40% to 60%, depending on the area. This situation should be addressed as a whole, with modern and innovative scientific methods and tools, in order to prevent further strain on the aquifers.

Food

Growing population and consumerism increase the demand for food and the pressure on critical resources.
Food and water security is exacerbated by climate change and environmental degradation beyond expected standards, affecting the prices of raw materials.

Key Points:

- Enhancing research on alternative raw materials
- Improving water resource management and new consumption patterns
- Better / more effective environmental regulations and regulations concerning natural resources
- Focus on circular economy
- Strategic autonomy



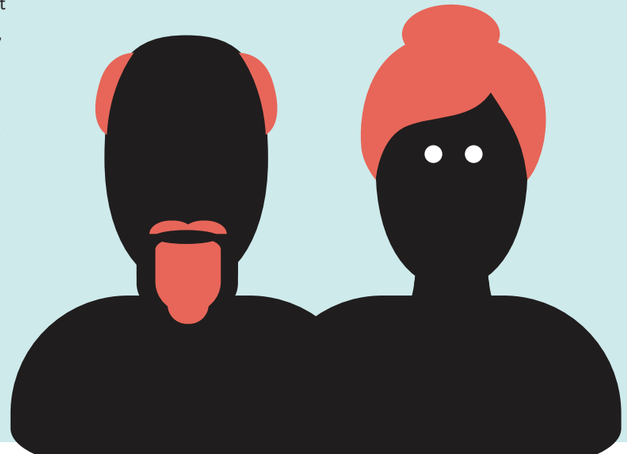
Megatrend 3
Demographic imbalances

Population Ageing

As the Organization for Economic Co-operation and Development (OECD) mentions in its report (OECD Pensions at a Glance), over the last 40 years the number of people over the age of 65 as a share of people of working age (15-64 years) in OECD countries, has increased from 20% to 31%, and by 2060 this share will likely have doubled to reach 58%. «Population ageing is expected to be particularly rapid in many countries, including Greece», the report states[14]. The relevant share in Greece is estimated at 37.8% in 2020 and at 79.7% in 2060. Greece's workforce -people aged 15 to 64- is projected to decrease by at least 35% by 2060, whereas in OECD countries it will decrease by 10% on average.
Rapidly ageing population in OECD countries continues to put pressure on their pension systems, underlines the Organization for Economic Co-operation and Development (OECD) in the above report. According to a recent UN report[15], by 2050, one in four people living in Europe is expected to be aged 65 and over.
According to that report, in 2050, Greece will hold the 4th place in the world among countries experiencing the biggest reduction in their working age population. In addition, according to OECD data (2018), Greece will suffer the largest decrease in its total productivity index (among EU countries), due to the effects of its ageing population[16].
Population ageing has created a new reality for the EU-27, leading to labour supply reduction and economic challenges. The ageing population will create new markets in the near future and will contribute to an increased demand for services in fields that require innovation such as health systems, infrastructure, transport, communications and technology. The development of the "silver economy" is based on the assumption that in the future people will enjoy good health, live longer, and the retirement age will gradually rise. Meanwhile, it is estimated that the reduction of the workforce will be offset by the intense automation caused by new technologies.
This is confirmed by OECD studies, which conclude that the ageing population in most OECD countries will increase pressure on health services, long-term care systems and public finances, whereas the consequent ageing of the workforce will restrain the performance of the economy. Science and technology, especially ICT applications, will play an important role in helping older people stay as healthy, autonomous and active as possible[17].
Innovation in high as well as medium-tech industries is the key dimension of sustainability in the new economic models that are being developed.

Global population growth

In 1950, five years after the United Nations was founded, the world population was estimated at about 2.6 billion people. It reached 5 billion in 1987 and 6 billion in 1999. A global campaign called «7 billion actions» was launched to commemorate the world population landmark of 7 billion people, which was reached in October 2011. According to a 2018 UN study, the world population is expected to grow by 2 billion people in the next 30 years, increasing from 7.7 billion today, to 8.6 billion in 2030[18], 9.7 billion in 2050 and potentially around 11 billion by 2100.



This dramatic growth has been largely driven by the increase in the number of people surviving to reproductive age and has been accompanied by significant changes in fertility rates, increasing urbanization and accelerating migration. The global fertility rate, which fell from 3.2 births per woman in 1990 to 2.5 in 2019, is projected to decline further to 2.2 births in 2050[19]. However, despite the decreasing fertility rate, the global population will continue to grow, mainly because of the increasing life expectancy. These trends will have far-reaching implications for future generations[20].

Demographic projections reveal a world divided into two groups: in the first one the population is growing, whereas in the second one it is shrinking. Sub-Saharan Africa and South Asia (Nigeria, Tanzania, Ethiopia, India and Pakistan) are projected to increase in population. In addition, of particular interest is the population increase in countries at the EU's southern borders (e.g. Egypt alone will add 21 million inhabitants). The population in the EU's eastern neighbouring countries is either shrinking or growing at a slower pace, following EU's demographic trends. Overall, the populations of more than 50 countries will decrease in the coming years.
Understanding global population trends and anticipating impending demographic change is vital to achieving the 2030 Agenda for Sustainable Development. The Agenda stresses that people are at the heart of sustainable development, reflecting the ideals set out in the Action Plan of the International Conference on Population and Development, adopted in Cairo in 1994. The population trends observed in recent decades show that there has been significant progress until today in several of the Sustainable Development Goals (SDGs)[21].
Global population growth results in more food and housing needs, population movement (migration), depletion of natural resources, urban impoverishment, increasing pressure on the environment and climate stability, as well as increasing energy needs.
More food needs will cause agricultural production to double in four decades, water consumption to increase by 30% by 2030, and housing demand in urban areas to increase by three billion people.
Europe has recognized that overcoming these complex and interconnected challenges requires research and innovation, in order to achieve rapid, coordinated and sustainable changes in lifestyle and resource use across all levels of the society and the economy. The well-being of European people and of future generations is depended on the way the necessary transformations are carried out.
To address the consequences of global population growth, people must radically change their lifestyle and seek innovative solutions for the production, consumption, processing, storage, recycling and disposal of biological resources[22]. In addition, the anticipated challenges can be addressed with both known and new innovative technologies of applied engineering, and their sustainable application in practice[23].

Key Points:

- Employment and economic growth
- Sustainability of public finances, health and retirement systems
- Social cohesion, family models and intergenerational relationships
- New services and products focused mainly on the elderly
- Pressure on systems and policies for research and development, due to declining youth participation (Brain Drain / competition persists)
- Possible further increase of urbanisation

Megatrend 4
Urbanisation

The global pace of urbanisation continues to increase. At the same time, cities grow and operate more and more autonomously, setting new social and economic standards. The world is much more urbanised than previously believed. According to **the recently adopted definition of urban areas**[24] 76.5% of the population already lived in urban areas in 2015, contrary to previous estimates of 54%. Both the total number and the relative importance of cities are steadily increasing.
The urbanisation rate varies widely by region. Nine out of ten future megacities (of over 10 million people) are expected to be located in the developing world (accounting for 90% to 95% of urban expansion in the coming decades). Most of the urban population growth is expected to occur in Asia, Africa and Latin America. Of course, in recent years, some cities have experienced a population decrease, mainly in Asian and European countries with low fertility rate, where the overall population size is stagnant or declining, or experiencing an economic contraction.
In addition, migration and natural disasters contributed to that population decrease. However, on a global level, fewer cities are expected to experience population decrease from today until 2030, in comparison to the last two decades, while 43 major cities are expected to have more than 10 million inhabitants[25].

There is a close link between environmental challenges and opportunities related to urbanisation. Many cities are struggling to address the social, economic and environmental challenges posed by factors such as overpopulation, degradation, social inequalities, rising temperatures, pollution and traffic congestion.

On the other hand, the proximity of people, businesses and services provides opportunities to rebuild cities with more efficient use of resources. Population density in cities entails shorter routes to work and services, more walking, more intensive use of bicycles or public transport, while apartment buildings or complexes require less heating and less space per person. As a result, city dwellers consume on average less energy and occupy less land per capita compared to rural residents, according to a European Environment Agency (EEA) study[26].

The great challenge for Europe's urban areas is to find balance between compact high-density areas, on the one hand, and quality of life in a healthy urban environment, on the other.
Understanding the key trends of urbanisation, that may unfold in the coming years, is vital to the implementation of the 2030 Agenda for Sustainable Development, including strategic measures to create a new urban development framework aiming at enhancing living standards, providing and managing public services and developing a sustainable economy using new technologies that will lead to the creation of a third generation of «smart» cities[27]. A key requirement is the use and proper utilisation of a large amount of information, whether it be data on road traffic, quality of natural resources such as water and air, train schedules or citizens' mobility. At the same time, innovative solutions in systems and products in the construction and energy sectors will face the challenges of urbanisation, for which the cooperation of policy, industry, business and research is required.

Key Points:

→ Economic, social and environmental challenges, such as higher temperatures and increased pollution require innovative solutions to ensure a high standard of living, whereas authorities need to set new goals, while redefining cities' operation and planning[28]

→ Urbanisation attracts large investments (e.g. the metro, the port and the airport in Central Macedonia), increases employment opportunities and attracts specialised staff. The only way forward for communication and technology sector (ICT) is research and provision of innovative products

→ The new housing "model" includes changes in logistics, public transport, building regulations and materials

→ Research and innovation

Megatrend 5

Rapid technological development and Hyper-connectivity

Evolution in technology has always been a defining factor that signalled the dynamics of the economic system and had multiple effects on various areas such as health, communication, housing, nutrition, energy, also affecting the productive and economic activity, work, employment skills, and governance.

Technology evolving at a rapid, exponential rate, changes the economic models, creates a new business reality, influences consumer behaviour, social structures, educational needs, leads to globalisation and requires broader business and political strategies as well as fast reflexes by regulating authorities, control mechanisms and legislators, to adapt to the new circumstances.

Developments in genetics, nanotechnology, robotics and artificial intelligence, photonics, quantum mechanics, and other emerging technologies, as well as synergies between them are accelerating. They change the nature and speed of the new scientific discoveries and challenge our understanding of what is possible. Hyper-connectivity, the «internet of everything», augmented reality and collective intelligence systems, combined with the reduced cost of implementing new technologies can transform entire production and management systems[29].

Atomically Precise Manufacturing (APM), Gene Modification, Robotics, Space Technology, Photon Modification, Accurate Brain Imaging and Cognitive Science Developments, Synthetic Biology, Augmented Reality, and Photon Teletransfer are just a few of the existing applications (some still at research level).

Hyperconnectivity is expanding rapidly, whereas physical-digital integrations, the “Internet of Everything”, smart home technology, big data, augmented and virtual reality and machine learning, blockchain with Distributed ledger technologies change our lives and our way of thinking.

The world’s advanced economies are again likely to dominate this next wave of technology-based industries. In addition to these likely winners, China and India -which are already leveraging their deep pools of technical talent and massive domestic markets to become “players” in digital industries- are in a strong position to serve as engines of innovation, investment, and wealth creation[30].

In Europe, according to a study by Ernst & Young (European Attractiveness survey-Technology), the technology sector is evolving rapidly, with the digital technology industry being the one that drives Europe’s growth, followed by clean technology (cleantech - 25%) and energy and utilities (21%), according to 39% of investors[31].
The study notes that Europe hosts more than a third of the world’s cities which are most likely to build the next tech giant, with London and Berlin being among the top 10 most attractive hotspots for technology. A prerequisite for attracting investment is the existence of a workforce with technological skills.

Key Points:

→ Security will be a major variable at all levels of technology

→ Space is the new area for the development of defence technologies and security

→ A global system for collecting and evaluating new technologies and their impacts could ensure greater security

→ Some technologies reveal significant dilemmas and implications related to ethical and security issues, and therefore actions for the common good are required

→ «Open science», citizen participation in science-related projects, dissemination of research results and collaborative interdisciplinary research determine the democratisation of science

→ Research and Technology constitute a field in which competition between global players has already emerged, along the lines of the geostrategic power game

→ The issue of digital divide and illiteracy is crucial to the cohesion of societies

→ Artificial intelligence will strongly affect our future

Megatrend 6

Growth of middle class & consumption on a global level

The year 2018 was a tipping point, according to a study by the Brookings Institution, as for the first time just over 50% of the world's population (approximately 3.8 billion people) were classified as "middle class[32]", while in 2030, the middle-class is expected to reach 5.3 billion people. Most of this growth will occur in Asia. "Middle class" gains importance for the world economy if one considers that it is growing at a faster pace than the other classes, gaining a larger share of the total income. The growth of the middle class is accompanied by investment opportunities, a change in consumer behaviour and a rise in total purchasing power, which boosts global demand. The larger the share of the middle class gets, the larger the economy grows in the long run.

While the growing middle class could be the driving force for economic growth, changes in consumer behaviour and consumption patterns are expected to increase demand for food, water and energy by about 35%, 40% and 50% respectively by 2030.

In fact, the trend is strong enough, according to World Bank forecasts, that it is expected to completely offset the slowdown in income growth in developed markets. By 2030, China and India together will account for 66% of the world middle class population and 59% of the middle class consumption[33]. In fact, by then over 70% of China's population could be middle - class, consuming nearly 10 trillion dollars in goods and services, while India could be the largest middle class consumer market in the world, surpassing both China and the United States[34].

In addition, as the available income of these consumers increases, their consumer habits also change, as already evident in China and India, where consumers are now turning from basic consumer goods and clothing to luxury goods and services, such as tourism, cosmetics, restaurant services and entertainment, health, sports, education and transport.

These conditions hold great opportunities for a country like Greece. A pertinent example is that the arrivals of tourists from China to Greece, rose by 31% in 2019 compared to 2018.

The mechanisms through which middle class influences economic growth are: **stable demand** (stable demand has a positive effects in investment and investment boosts economic growth), **trust** (the stronger the middle class, the more trust and stability there is in society and economy), **virtuous governance** (a strong middle class encourages virtuous governance, the functioning of institutions, the fight against inequality), **values** (social responsibility, work ethics, intolerance towards crime etc.[35]).

Key Points:

→ Significant export opportunities in different regions that may require new products and promotion strategies

→ Increasing demand for innovative products, which requires greater emphasis on the ecosystem for their development

→ Increasing demand for tourism services and products, culture and health requires diversification in the industries' development models

Megatrend 7
Shift of Power towards the East & the South

The shift of global economic power from the established advanced economies of North America, Western Europe, and Japan towards the emerging economies of East and South continues. According to the latest PwC report, China has already overtaken the USA in "purchasing power parity (PPP)" terms and is also expected to become the largest economy in market exchange rate terms before 2030. Following the same course, by 2050 India is expected to overtake the US, becoming the 2nd largest economy in the world, while Indonesia is likely to climb to the 4th place, surpassing advanced economies such as Japan and Germany. At the same time, Vietnam will emerge as the fastest growing economy by 2050 and is expected to climb to the 20th place in the world GDP ranking[36].

If current trends continue, by 2050, the economic and political influence of G7 will steadily shift to E7 (G7: USA, UK, France, Germany, Japan, Canada and Italy - E7: China, India, Indonesia, Brazil, Russia, Mexico and Turkey). In the last half of the 20th century, some Asian nations, especially Japan, China, and Korea, underwent a gradual reform and modernization process that allowed Asians to compete or even challenge Europe and the United States in political, economic, socio-cultural and military affairs.

The progress and the achievements of Asians in science and technology, the rapid growth of their population and middle class and their rich natural resources, have given them the advantage to intervene and co-shape the world of the future. Over the past thirty years, free trade reforms have helped several Asian countries to significantly expand their economic growth and prosperity.

Some of the most well known places for investment and business in the world are located in Asia. In the military sector, China has the largest army in the world and the second largest naval fleet in the Pacific. India is recognized as the sixth largest naval force and Pakistan as the seventh largest military power in the world. Four declared nuclear states, namely China, India, Pakistan and North Korea are located in Asia. Moreover, Asians have applied advanced research in space technology. China, Japan, Korea, Pakistan, India and Singapore have launched satellites in space orbits in order to achieve modern communication and collect weather information. In recent years, China has also begun sending scientists into space, following the United States and Russia.

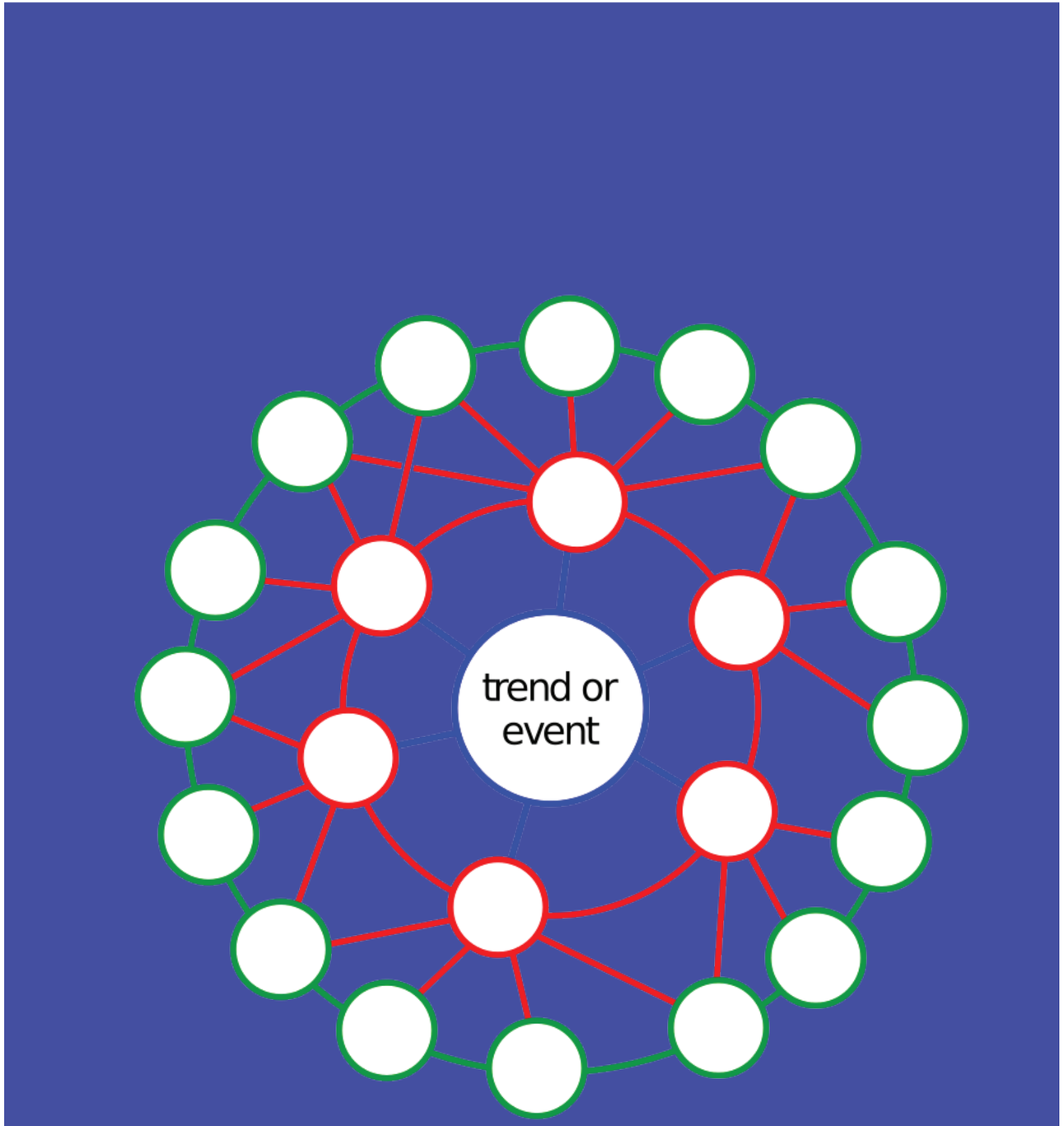
By 2030, about 5 billion people will belong to the middle class. This rich global community will have significant purchasing power. Two-thirds of those people will reside in the Asia-Pacific region. However, the individual purchasing power of citizens in the West will remain higher than that of consumers in China as well as in India. These two countries will account for a growing share of world production, 35% of the world's population and 25% of world's GDP, opening the way for a global economic shift of power.

New international economic, financial and political systems are emerging as the impact of the New Development Bank (NDB) and China-based investments (Silk Road) increase. At the same time, the power of multinational companies and non-governmental organisations is growing and a new global consciousness is emerging. Despite the economic turmoil of 2008, the economic and political relations forged by technology continued unabated and accelerated, leading to a dynamic new phase of globalisation, creating new opportunities but also causing unexpected instability. Two contradictory situations have appeared: on the one hand, the creation of new free trade zones worldwide and on the other, a strong tendency for more protectionism.

The recent global COVID-19 pandemic also revealed the vulnerability of a super-globalized world. This socio-economic upheaval may have the power to lead to the reshaping of the global interconnection, e.g. review of strategic areas or new dimensions of geopolitical cooperation and coordination.

Key Points:

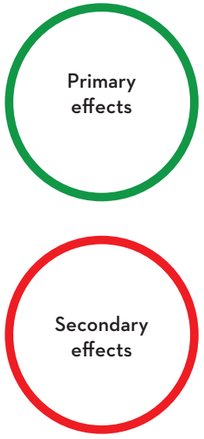
- → New geostrategic policies and a multipolar world
- → More regional forces
- → Emergence of leading (populist) figures - Confusion, inability to discern a specific economic / social direction
- → Challenges and Opportunities for collaborations (Asia & Africa)
- → Expansion of producers and start-up businesses in Asian markets (and gradually in Africa)



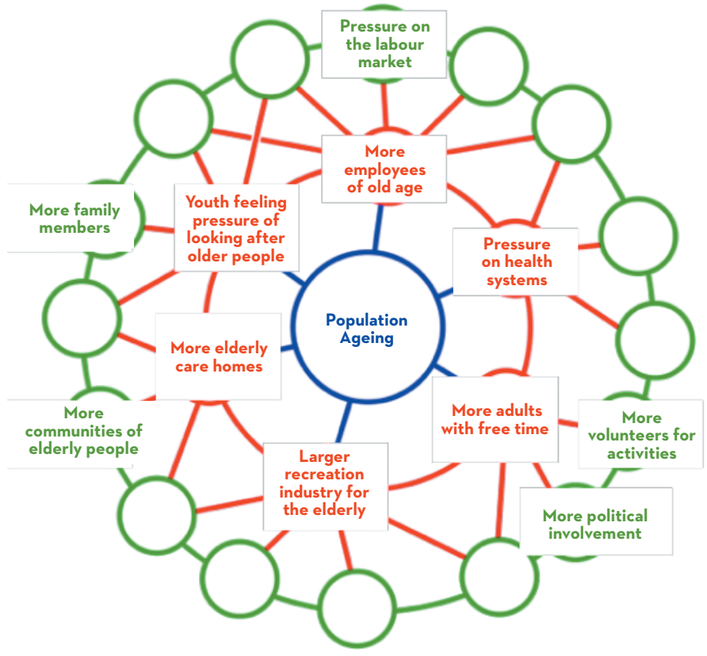
Trend or event
Futures Wheel
by Jerome Glenn

ANNEX 1 Example of use of Megatrends

Reading Megatrends offers a glimpse into a possible future.
Using simple tools obtained from futures studies can allow a more detailed examination of the impact on a specific sector of interest.
The futures wheel developed by Jerome Glenn (The Millennium Project) allows for a simple analysis of the primary and secondary effects and could be directly used by ministries to make a first mapping of future challenges.



Example



The circle can get as large as needed and can focus on any specific area of interest, however it is better to include effects that do not seem to be, at first, directly related to the area of interest.

Sources

1. https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en
2. "It is noted that a significant part of the ideas and links referred to the introduction, are found in the analysis presented in the following sources: https://www.sitra.fi/en/topics/megatrends/#current , https://www.weforum.org/ , Global Trends 2040: a more a more contested world, USA National Intelligence Council, 3/2021. The editor of the current publication presented the specific ideas and links in light of their probable estimated impact at national and regional level. This report has taken into account and has included the comments of the Working Group on Strategic Foresight and Futures Research, and has its approval"
3. https://www.weforum.org/platforms/shaping-the-future-of-the-new-economy-and-society
4. https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/
5. https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en
6. http://www.certifiedfuturestrategist.com/wp-content/uploads/2016/04/Trends-Business-models-2030-v1.pdf
7. https://www.futures.gr/wp-content/uploads/2018/12/ChinaRCH2030-PAGES-SPREADS.pdf
8. https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en
9. https://www.futures.gr/2019/01/03/china-2030-current-and-future-innovation-landscape/
10. https://knowledge4policy.ec.europa.eu/climate-change-environmental-degradation_en
11. https://knowledge4policy.ec.europa.eu/aggravating-resource-scarcity_en
12. https://knowledge4policy.ec.europa.eu/aggravating-resource-scarcity_en
13. https://www.ris3rcm.eu/wp-content/uploads/2021/07/PKM-RCH2030-PAGES-soma80.pdf (in Greek)
14. http://www.enikonomia.gr/economy/226575,oosa-tachytati-i-giransi-tou-plithysmou-stin-ellada-pos-epireazei.html, 2019 (in Greek)
15. https://www.un.org/development/desa/publications/world-population-prospects-2019-highlights.html
16. https://www.tovima.gr/2020/08/29/society/vomva-gia-tin-elliniki-oikonomia-i-giransi-tou-plithysmou/ (in Greek)
17. https://cor.europa.eu/en/engage/studies/Documents/Active-ageing-local-and-regional-solutions/EL.pdf
18. United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, New York https://ec.europa.eu/assets/epsc/pages/espas/chapter1.html
19. https://www.un.org/development/desa/publications/world-population-prospects-2019-highlights.html
20. World Population Prospects 2019 – Highlights, Department of Economic and Social Affairs Population Division United Nations New York, 2019 https://www.un.org/en/sections/issues-depth/population/index.html
21. https://population.un.org/wpp/Publications/Files/WPP2019_Highlights.pdf
22. https://eur-lex.europa.eu/legal-content/EL/TXT/HTML/?uri=CELEX:52012DC0060&from=EN
23. https://www.nato.int/docu/review/2011/Climate-Action/Population_growth_challenge/GR/index.html
24. https://blogs.worldbank.org/sustainablecities/how-do-we-define-cities-towns-and-rural-areas
25. https://www.ris3rcm.eu/wp-content/uploads/2021/07/PKM-RCH2030-PAGES-soma80.pdf (in Greek)
26. https://www.eea.europa.eu/el/themes/urban/intro (in Greek)
27. The 3rd generation of Smart Cities refers to cities where a human-centered vision prevails, based on the co-creation of a «senseable» city, which focuses primarily on the needs of its citizens, by finding the most appropriate solutions through new technologies. The 1st generation referred to smart cities where the vision of technology giant corporations to create innovative cities prevailed, while the 2nd generation referred to cities where the vision of governments and cities to improve the quality of life through the use of technology is applied.
28. https://knowledge4policy.ec.europa.eu/accelerating-technological-change-hyperconnectivity_en
29. https://www.bcg.com/publications/2019/unleashing-innovation-middle-billion-economies
30. https://parallaximag.gr/epikairotita/diethni/ragdaia-anaptyksi-tis-technologias-stin-evropi (in Greek)
31. UN World Urbanization Prospects, The 2018 Revision (May 2018): Our World in Data Urbanization (Sept 2018) https://www.huffingtonpost.gr/entry/e-astikopoiese-oi-nees-technoloyies-kai-mia-exepne-pole-3es-yenias_gr_5cee6320e4b0975ccf5dfeae (in Greek)
32. Brookings uses a classification of households into those in extreme poverty (households spending below $1.90 per person per day) and those in the middle class (households spending $11-110 per day per person in 2011 purchasing power parity, or PPP) https://www.brookings.edu/blog/future-development/2018/09/27/a-global-tipping-point-half-the-world-is-now-middle-class-or-wealthier/
33. https://ec.europa.eu/knowledge4policy/growing-consumerism_en
34. https://www.ris3rcm.eu/wp-content/uploads/2021/07/PKM-RCH2030-PAGES-soma80.pdf (in Greek)
35. https://www.kathimerini.gr/economy/local/815562/apopsi-h-anaptyxi-kai-i-mesaia-taxi/ (in Greek)
36. Pricewaterhouse Coopers (PwC) Report 2016

Sources

1. https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en
2. https://www.sitra.fi/en/topics/megatrends/#current
3. https://www.weforum.org/
4. Global Trends 2040: a more a more contested world, USA National Intelligence Council, 3/2021
5. EU – China 2025 Innovation Collaboration
6. EU – China 2030 Innovation Collaboration
7. Airthings: The trajectory of the air pollution in 2040 for: Tirana, Sofia, Thessaloniki, Skopje, and Nicosia
8. Doiran Lake 2040: Challenges and strategies in interregional collaboration
9. Innovation Environment 2030: Regional Authority of Central Macedonia

Megatrends 2040

Volatility, Uncertainty,
Resourcefulness

HELLENIC REPUBLIC
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Megatrends 2040

Volatility, Uncertainty, Resourcefulness

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