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FACTS & FINDINGS

Economic Megatrends up to 2020

WHAT CAN WE EXPECT IN THE FORTHCOMING YEARS?

David Gregosz

The situation in which the world finds itself at the beginning of the 21st century is not an easy one. Economic upheavals and ecological problems are challenging decision-makers all over the globe. We can already envisage today that some developments relevant to (economic) policy will be instrumental in shaping the years up to 2020. This paper is to serve as a basis for discussion, providing an overview of the impending challenges in the remaining years of the current decade. The trends, which are set out in the form of theses, indicate possible developments in a future characterised by random events, discontinuities and the unexpected, which may not necessarily materialise in that form. In spite of this proviso, it will be helpful to reflect deeply on the described phenomena – the pressure for consolidation, new power centres, population growth, resource shortages and digitisation. It is possible to give some direction to the future from within the present through political decisions.[1]

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"There is in fact no such thing as the future, singular; only futures, plural."[2]

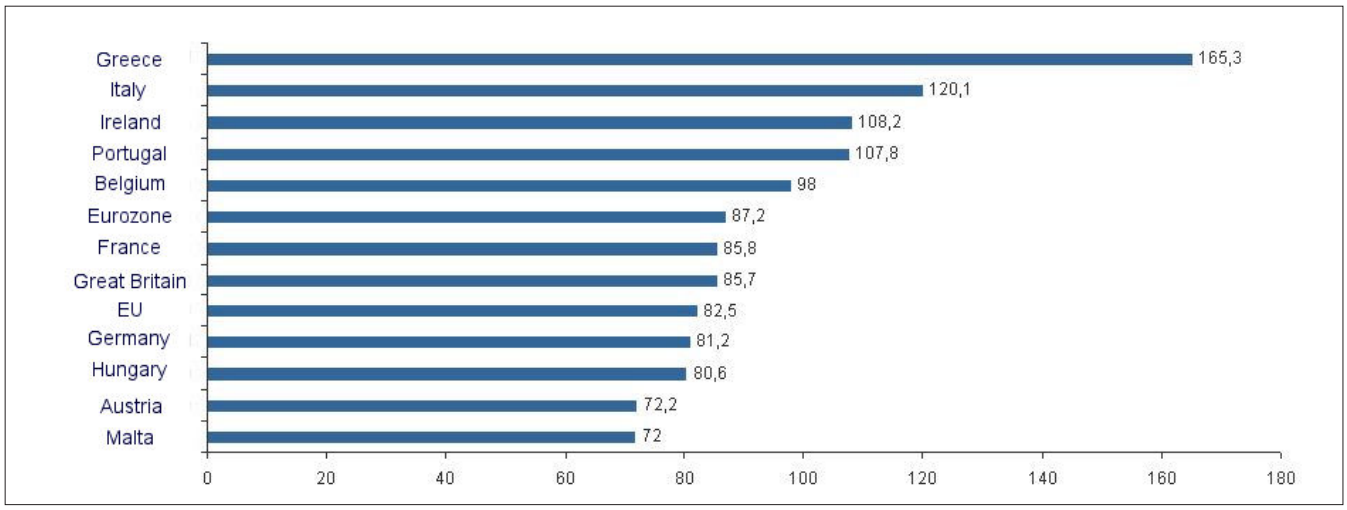
CONTENTS

TREND ONE: PRESSURE FOR CONSOLIDATION IS RISING IN THE WEST

In response to the over-indebtedness of national budgets in the Western world, austerity policies[3] and the search for new sources of state revenue are likely to play an important role. Seeing the dimensions of the indebtedness (see Fig. 1 and 2), this process may well take a decade and impact on global growth prospects. It will probably push equally urgent topics, such as environmental and climate problems, into the background.

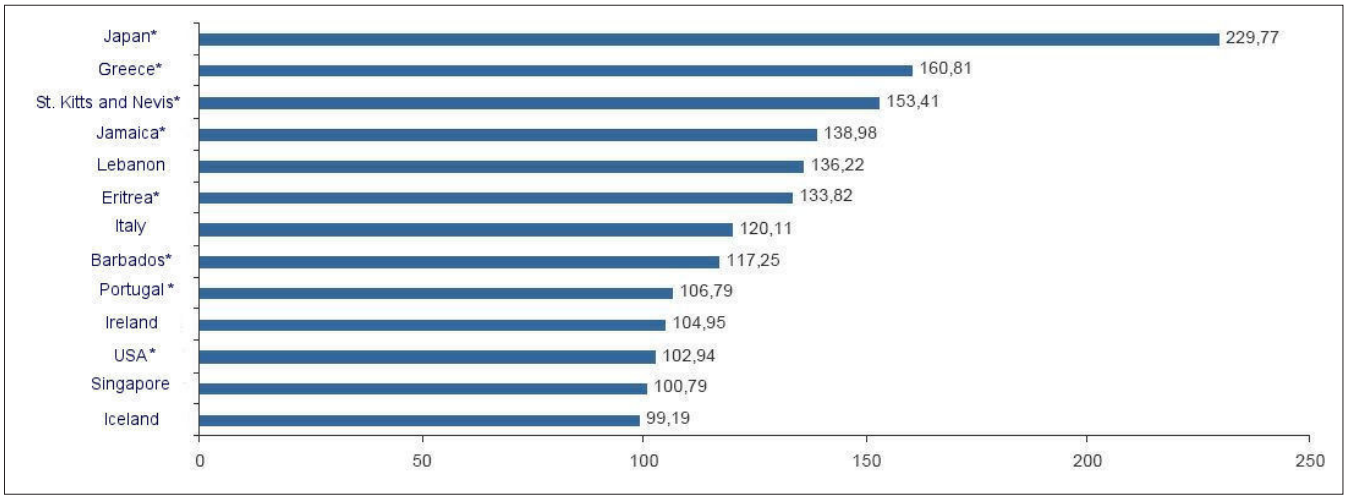
It is clear that the serious deterioration of the national debt crisis in Europe, which started in the early summer of 2010 and developed into a crisis of confidence, marked a turning point. In the eyes of some observers "the end of the 'era of indebtedness' of Western democracies" has actually begun[4]. This so-called "era of indebtedness" will most likely be followed by a period in which *firstly savings efforts, secondly structural reforms* (the affected areas including labour markets, welfare systems and public services) and *thirdly the search for new sources of revenue* (exemplified by the introduction of a financial market tax that is being discussed in Europe) will come to the fore in government action.

Fig. 1: National debt in the countries of the European Union in 2011 in relation to gross domestic product (GDP)



The statistic shows the national debts in the countries of the European Union in 2011 in relation to gross domestic product (GDP). The data relate to the entire state and are comprised of the debts of central government, provinces, municipalities, local authorities and social security. In 2011, the national debt of Greece was 165.3% of gross domestic product.
Source: Statista

Fig. 2: Countries with the highest national debt in 2011 in relation to gross domestic product (GDP).



* Estimate. Values have been rounded to make the statistic easier to understand. The statistic shows the twenty countries with the highest national debt for 2011. The data relate to the entire state and are comprised of the debts of central government, provinces, municipalities, local authorities and social security. With a national debt of around 230% of gross domestic product (GDP), Japan ranked top amongst the countries with the highest national debt in 2011.
Source: Statista

The beginning of this process can already be observed in Europe's large economies (France, Spain, Italy) as well as in the USA and Japan. The financial markets occupy a particular role in this situation. International investors are only prepared to purchase further government bonds and thus provide state funding in return for corresponding risk premiums. In some areas, the increased cost of refinancing is seriously curtailing the expenditure options of many states and forcing them to adopt the above-mentioned set of (unpopular) measures. The social changes that have been initiated due to the financial, economic and national debt crisis(es) are quite considerable in many countries:

- *In France*, Prime Minister Jean-Marc Ayrault announced a five-year austerity programme in his statement of government policy at the beginning of July 2012. The French Socialists, however, are focusing on state revenues. Initially, tax reliefs relating to wealth and inheritance taxes, which the previous government had approved, are being revoked. In addition, there are plans to introduce a top tax rate of 45 per cent as well as an "exceptional tax" of 75 per cent for incomes exceeding one million euros plus the closure of tax loopholes. With regard to the planned measures, the president of the French court of auditors, Socialist Didier Migaud, not only recommended to increase taxes but to reduce expenditure at the same time. In an interview with the daily newspaper *Le Monde*, Migaud pointed out that it was possible to slim down central government and that it was necessary to make savings in the state social security system as well as in the regional authorities that are mainly administered by Socialists.

- *In Italy*, the government around Mario Monti decided in July 2012 to make cuts totalling 26 billion euros by the end of 2014. A large proportion of the cuts affect public services and the health sector. In this year alone, public expenditure is to be reduced by 4.5 billion euros, and by a further 10.5 billion next year. Also, in an effort to slim down the administrative apparatus, entire provinces are to be abolished in Italy. A labour market reform was already initiated back in July after lengthy negotiations. Essentially, the changes in labour law will make it possible to facilitate making people redundant for economic reasons and to further growth and productivity through more flexible regulation. An increase in VAT from 21 to 23 per cent has been postponed for the time being, but measures against tax avoidance and tax evasion have been tightened, real estate tax has been increased and a luxury tax has been introduced.

- *In Spain*, the government wants to achieve savings of 65 billion euros with a further austerity package involving public budget cuts and tax increases. Prime Minister Mariano Rajoy announced this in July 2012. It is already the fourth austerity package that his government has approved within a period of six months. In 2012, civil servants and public service employees will have to do without their Christmas bonus, and their holiday entitlement has been cut. In addition, payments to political parties and trades unions are being reduced by 20 per cent across the board. A reduction in coal subsidies is also planned. VAT is being increased from 18 to 21 per cent, with the reduced rate increasing to ten per cent while the even further reduced rate remains at four per cent. Unemployment benefit for the previously employed will be cut after six months, but continue to be paid for a maximum of two years in total. The number of state-owned companies is to be reduced drastically. The railway sector, the ports and the airports might be privatised.

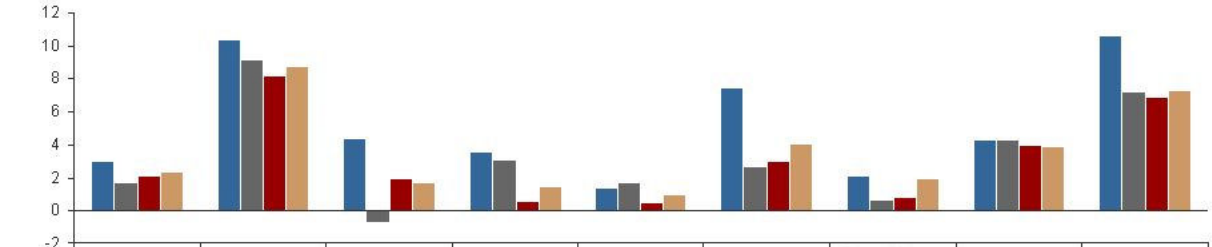
- *In the USA*, tax and budgetary policy constitutes one of the most important topics ahead of the presidential elections in November 2012. The way the Republicans want to reduce the deficit is mainly by slimming down the government apparatus, making savings in social services and cutting expenditure. President Obama, on the other hand, wants to close tax loopholes and increase taxes for higher earners. The conflict about US expenditure policy has been intensifying since the country reached the statutory debt limit (14.3 trillion dollars) in May 2011[5]. After hard negotiations between Democrats and Republicans, the sides finally agreed on raising the debt ceiling to 16.4 trillion dollars in two stages and simultaneously approved a comprehensive savings package. In a first stage, government expenditure is to be cut by an amount, which has already been set at 917 billion dollars, over the next ten years. Further savings measures totalling approx. 1.8 trillion dollars are to be defined more precisely by the end of November by a special body, the so-called Super Congress. Should no agreement be reached there, automatic cuts will take effect, hurting both sides equally – such as cuts in expenditure on social services (Democrats) and defence expenditure (Republicans). But the future orientation of the USA in matters of finance and tax policy will not be determined until after the presidential elections.

- *In Japan*, the last few months have seen an upsurge in warnings that the East-Asian country might soon become mired in a national debt crisis such as that experienced by Greece or Italy. The rating agencies have already downgraded Japan's credit rating back in 2011. Currently, Japan is still able to issue new government bonds at low interest rates because 95 per cent of the national debt is in the hands of domestic investors. But given its aging and shrinking population, it is likely that Japan will soon no longer be able to cover its debts at home. Indeed, Japan's savings ratio has been at an ebb for a long time, while companies are increasingly investing in corporate acquisitions abroad. As a result, savings are flowing more rarely into government bonds and are thus less able to carry Japan's national debt. The country was further weakened by the tsunami and earthquake disaster as well as the subsequent reactor accident in Fukushima in March 2011. Parliament had approved a special budget for the reconstruction work required after the environmental destruction. The relevant funds are procured mainly through the issuing of so-called reconstruction bonds. These bonds are driving the national debt, which is currently already close to 230 per cent of gross domestic product, up even further. In view of the extent of the indebtedness, Japan's head of government Yoshihiko Noda pushed through a staged increase of excise tax from 5 to 10 per cent by 2015 in June 2012.

The above-mentioned examples illustrate a general trend in the Western world. In this context, one needs to consider that the cuts in expenditure and/or tax increases decided on in Europe, North America and parts of Asia will be exerting an impact virtually simultaneously, which will then have consequences for both national and global economic growth (see Fig. 3). The industrialised countries are increasingly faced with the dilemma of having to boost growth on the one hand and having to reduce debt on the other – both at governmental and at corporate level. The up-and-coming emerging economies, such as Brazil, China and India, will only be able to shelter themselves from this development to a degree because their export-driven growth (incl. raw materials, consumer goods) depend substantially on demand from Europe, Japan as well as the USA.

In this situation, a further substantial cooling of the global economy cannot be excluded – with corresponding consequences for companies (reduced utilisation of production capacity), employment (rising unemployment), government revenues (tax receipts going down) and social security systems (becoming overburdened). In its World Economic Outlook (July 2012), the IMF envisages that the global economy will only grow by 3.5 per cent in 2012, and then by 3.9 per cent in 2013[6] The report states that the worldwide upturn was showing "signs of further weakness" – especially due to the debt crisis in Europe and the gridlock in the budget dispute in the USA. The report also expresses concerns that "potential growth" in emerging economies such as China, India and Brazil might be lower than expected.

Fig. 3: Changes in real gross domestic product (GDP) in selected countries in 2010 and 2011 and forecasts for 2012 and 2013 (year-on-year)



	USA	China	Japan	Germany	France	Brazil	Great Britain	Russia	India
2010	3	10,4	4,4	3,6	1,4	7,5	2,1	4,3	10,6
2011	1,7	9,2	-0,7	3,1	1,7	2,7	0,7	4,3	7,2
2012*	2,1	8,2	2	0,6	0,5	3	0,8	4	6,9
2013*	2,4	8,8	1,7	1,5	1	4,1	2	3,9	7,3

In its World Economic Outlook, the IMF assumes that there will be a cooling of the global economy. It cites the debt crisis in Europe and the Budget dispute in the USA as reasons.
Source: IMF, World Economic Outlook April 2012, Page 53, 58, 62, 68.

In the light of past events, one can assume that the process of fiscal contraction, which appears unavoidable in most industrialised countries, and the weak growth of the global economy that this will no doubt entail will be accompanied by regular protests for more "social justice". Resistance by a diverse range of interest groups capable of organised action appears preprogrammed. The diffuse protest movements critical of capitalism (the "Occupy" movement, the "Outraged") provide a first insight into the mood of different sections of the population as they articulate their disquiet in the face of the burdens imposed by the financial crisis, the distribution of income and wealth, persistent unemployment and a "feeling" of insecurity. One current study from the US think tank Pew Research Center illustrates that this mood is reflected in the waning of confidence in market economy systems in many countries[7]. In Southern Europe in particular, there is a resigned frustration in evidence, which should not be underestimated with respect to the effects it might also have on the political systems of the region (protest culture, disaffection with politics and politicians, low voter turnout, left-wing and right-wing populism). In many cases it will be unavoidable to withdraw services currently offered by the state in former "service expansion democracies". This process puts the acceptance of democratic structures to the test. A partial refusal to accept such a social course with its abrupt changes in political direction cannot be excluded.

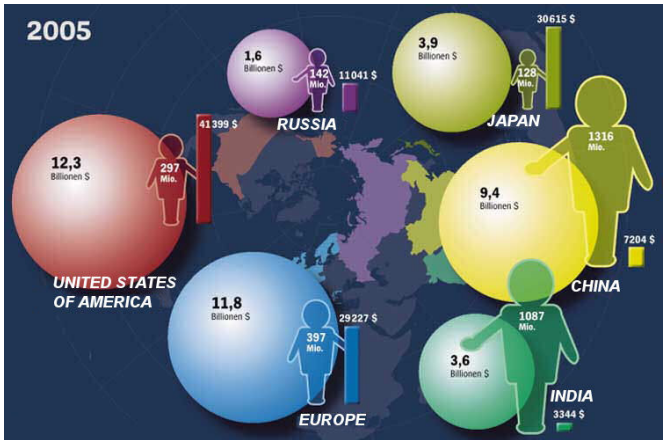
Conclusion: *We shall have to succeed in stabilising the European economic and currency region (with Southern Europe remaining the Achilles heel) and generating a new dynamic through structural reforms (EUROPE 2020 strategy, strengthening of the internal market, a policy of re-industrialisation, intensification of the European energy policy or possibly new transatlantic impulses) in order to be able to offer an economically successful European alternative to China's authoritarian state capitalism or the US-style "free" market economy at the level of the G20 countries. In the course of implementing such stabilisation measures, it will be important to ensure that all social groups will share in the "reform costs" according to their ability to pay. Should the impression take hold that certain stakeholders will be able to evade this impact this would have negative consequences for the democratic systems of the EU. Europe and the Eurozone will remain at the centre of worldwide attention for some time to come. Making substantial savings and generating substantial growth remains an extremely difficult challenge. Experience tells us that cuts in expenditure are quicker to implement than structural reforms to encourage growth, since the latter jeopardise invested rights and require a change in mentality. It is particularly the countries of Southern Europe that are having a tough time coping with this asymmetry.*

TREND TWO: THERE ARE NEW POWER CENTRES EMERGING

The successive shift of the dynamics into the Pacific Region has consolidated in consequence of the financial and national debt crisis(es) of the period from 2008 to 2012. Given their population numbers and in spite of their social problems, China and India should remain among the pacemakers of the world economy in 2020. Further countries – currently not yet on the public radar – are also poised to "take off".

The financial and national debt crisis is accelerating the shift in economic power. *While the economies of Europe and the USA have suffered major downturns in growth* and are still suffering from the consequences of their stabilisation measures today, *the effects of the crisis in China and India, for example, have been relatively harmless*. This also explains the self-assured manner in which the so-called "BRIC" and "Next 11" countries conduct themselves in connection with trade, currency, climate or regulatory issues and why they have been questioning the model of the Western market economy since 2007 in light of the experiences relating to the crisis. The rise of numerous emerging economies in the wake of foreign investment and improved capital resources has resulted in huge increases in wealth in these countries and in a totally new balance of power in the global markets.

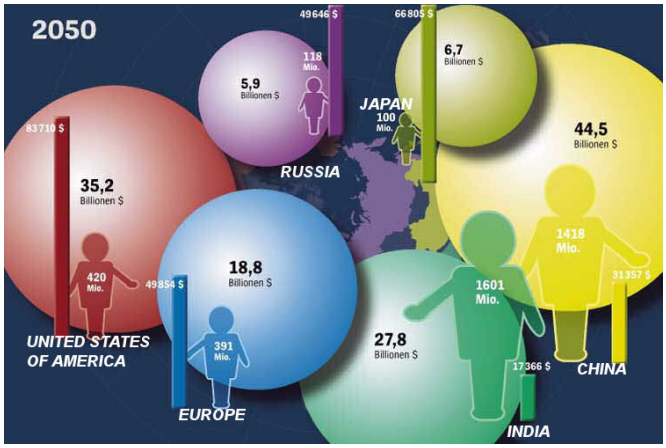
Fig. 4a: Gross domestic product in dollars, population in millions and per-capita income in dollars for important regions of the world in 2005



The graphic shows that 397 million Europeans generated 11.8 billion US dollars in 2005 (annual economic out-put GDP). This corresponds to a per-capita income of approx. 29,227 US dollars.
Source: Goldman Sachs forecast,
http://www.spiegel.de/jahreschronik/a-452965.html

According to calculations by Goldman Sachs, the five largest economies of the world in 2050 will be the four BRIC countries of Brazil, Russia, India and China plus the USA. The "Next 11" countries, comprising Mexico, Korea, Indonesia, Turkey, Iran, Egypt, Nigeria, Bangladesh, Pakistan, the Philippines and Vietnam, will then jointly generate a higher gross domestic product than the USA; and their combined GDP will actually be twice the size of that of Europe.

Fig. 4b: Gross domestic product in dollars, population in millions and per-capita income in dollars for important regions of the world in 2050



The graphic indicates that emerging economies and developing countries in particular are closing the economic gap. In 2050, China is likely to generate a GDP of 27.8 billion US dollars with a population of 1.4 million. This would equate to a per-capita income of approx. 31,357 US dollars.
Source: Goldman Sachs forecast,
http://www.spiegel.de/jahreschronik/a-452965.html

These few figures alone illustrate the impending shift in the power balance governing the global economy: away from the economic dominance of the G7 countries and towards the dynamically growing economies of Asia (see Fig. 4a and 4b). The significance of Europe and, respectively, of the USA as anchors of world politics and the global economy is on the wane. The advantageous demographic conditions in the up-and-coming emerging economies play a central role in this, but will simultaneously become a major source of stress for the environment. Countries such as China, India and Indonesia should be able to improve their future productivity and thereby their per-capita income significantly through efforts in the areas of education and infrastructure.

Asian countries are already spending considerable amounts of money on research and development and jointly produce millions of skilled workers and graduate engineers. This huge pool of talent will have a positive impact on the development of income and therefore purchasing power and increase consumerist tendencies significantly. The economic dynamics are consequently likely to focus more strongly on the domestic Asian markets and curb the currently relatively high significance of low-cost products for export.

Conclusion: *In this multipolar world with new power centres, the economic regulatory framework assumes an important role. This simply means that in future all trading partners should adhere to common rules to ensure fairness in free-market competition. As things stand, world trade does not satisfy this requirement. All in all, the development of political institutions, particularly at international level, has not kept pace with economic dynamics. International trade policies must promote efforts to fight protectionism, the sealing off of markets, non-tariff obstacles to trade and subsidising policies; they must also work towards intellectual property rights being ensured and international social, employment and environmental standards being observed. In addition, the global financial market architecture needs a fundamental overhaul. Enforcing certain standards and values among the G20 will require efforts to strengthen economic cooperation between the USA and Europe. Of course this demands a collaborative conscious reaffirmation of the values of Western civilisations and, respectively, their free-trade principles. But such "value collaborations" won't release the economies of Europe and of other Western states from the need to give far greater importance to research, development, education and innovation policies if they want to secure the levels of prosperity that they have reached. Against the background of the necessity to bring down the national debts in Western countries, there are likely to be conflicts of distribution and interest arising.*

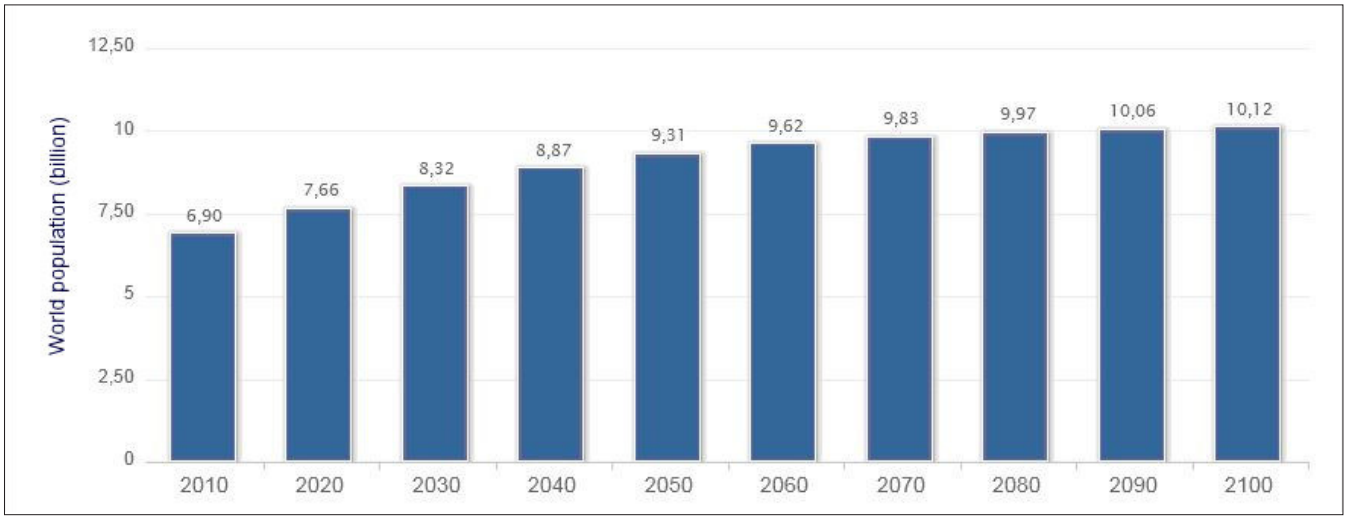
TREND THREE: POPULATION GROWTH DEVELOPS INTO A REAL CHALLENGE

Diverse demographic developments in industrialised, newly industrialised and developing countries will no doubt shape local political discussions and indirectly the innovation power of individual economies. To put it in a nutshell, saturated, aging societies will be competing with upwardly mobile, young populations.

According to 2010 forecasts of the United Nations[8], the world population will increase from currently approx. seven billion to far in excess of nine billion by 2050 (see Fig. 5 and 6). *While the population figures will remain virtually steady in the industrialised countries, the number of people in poorer developing countries will increase* by over 40 per cent from currently 5.6 billion to 7.9 billion. This might further exacerbate the global food situation and thereby food-related conflicts. In the richest countries of the world, consumption is already clearly above the level that might be sustainable for seven billion people. At the same time, 1.3 billion people are suffering extreme poverty. Most of them live in Africa. On average, they have to live on the equivalent of less than 1.25 dollars a day.

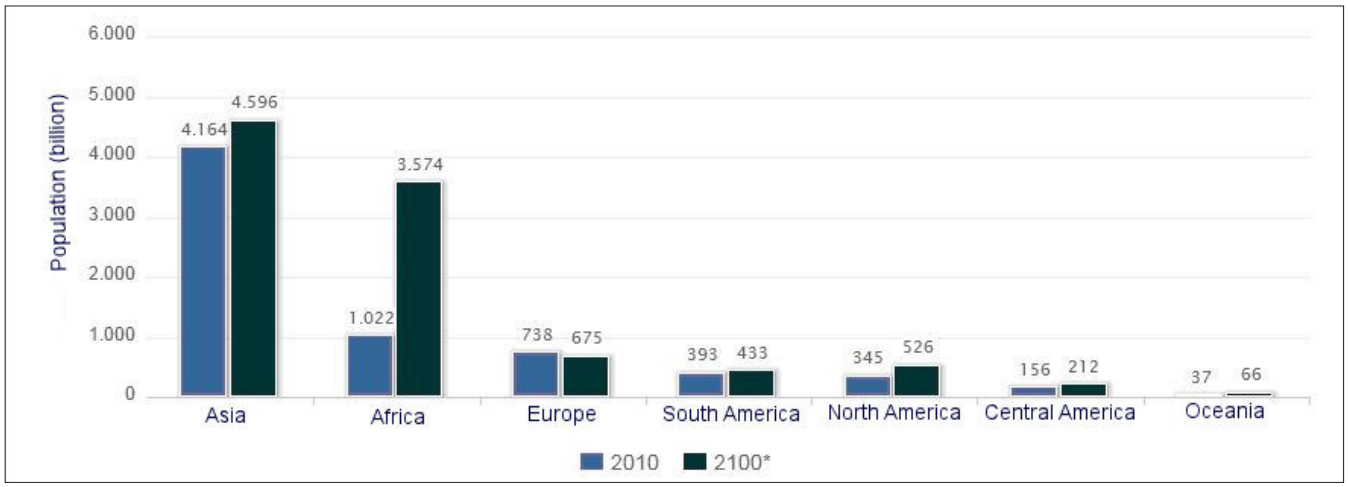
Cooperation with Africa, the continent with the fastest demographic growth on earth, is becoming a key issue for Europe in particular. Physical proximity alone demands that European countries take an interest in economic prospects for Africa in order to avoid streams of refugees, terrorism and fragile statehood becoming permanent threats to Europe.

Fig. 5: Development of world population from 2010 to 2100 in billions



Over the next few decades, the world population will grow dynamically. It will increase from just under seven billion to more than ten billion. In 1999, there were six billion people living on this earth. In 1927, it was a mere two billion.
Source: Statista.

Fig. 6: World population by continent in 2010 and forecast for 2100 (in billion)



While the populations in the industrialised countries will remain virtually static, the number of people in poorer developing countries and especially in Africa will rise rapidly.
Source: Statista

Against the background of rapid population growth, researchers working under the auspices of the British Royal Society presented a catalogue of measures for dealing with the demographic change in April 2012. The recommendations set out in the "People and the Planet" report[9] include

- firstly: *Improving the living conditions of the poorest through better healthcare and preventing famines*. In addition, population growth needs to be halted. However, this should not be done through coercive measures but through *better education opportunities*. Well-educated people on average live longer and in better health and are also in a better position to decide how many children they want to have. The provision of affordable contraception should also be improved.

- secondly: *Changing the economic model implemented by industrialised countries and emerging economies*, which is based on continuously increasing production and consumption while not giving sufficient consideration to sustainability. In the opinion of the researchers consumers should also be made to pay for the extra costs associated with their purchases. At the same time they stress that people should pursue renewable energies and efficient recycling more strongly. In short: *non-sustainable consumption must be curbed*, which would simultaneously reduce greenhouse gas emissions, deforestation and other environmentally damaging activities.

While population figures in the emerging economies and developing countries are rising, the opposite trend can be observed in some Western countries. The aging and in some instances stagnating populations, such as those in Germany and Japan, will produce entirely different economic problems there, which the politicians will have to address.

On the one hand, the sustained funding of the pension and social security systems is not yet secured in many aging countries. On the other hand, there is no certainty as to whether the aging population will be able to maintain the achieved level of prosperity. This would require considerable boosts in productivity through innovation to compensate for the reduction in the number of people in work. Whether an aging society can actually develop a sufficiently high level of innovation dynamics instead of languishing in the status quo remains to be seen. This alone is reason enough for aging societies to welcome the inward migration of highly qualified people, who will be able to provide impulses for innovation. Contrary to this situation, you see a young, upwardly mobile, Internet-influenced clientele growing up in emerging economies that wishes to improve its own level of prosperity.

Conclusion: *The world population is growing constantly. A not inconsiderable number of countries are bucking this clear trend when you look exclusively at the demographic development. The challenges that this entails (environment, migration, food, innovation dynamics) have not yet been sufficiently identified and analysed. Ultimately, sustainable economic activity is an absolute necessity against the background of a rapidly growing population in order to prevent the destruction of the planet. It is the responsibility of the industrialised nations to act as trailblazers – out of economic interest and ecological obligation following 200 years of industrialisation. The "Charter for Sustainable Economic Activity", which Chancellor Angela Merkel put forward at the G20 summit in Pittsburgh in September 2009, has been largely forgotten*[10]*, but would be in urgent need of revitalisation.*

TREND FOUR: RISING RESOURCE CONSUMPTION DEMANDS ACTION

In view of the finite availability of natural resources, strategies that aim at the gradual uncoupling of economic growth from resource consumption are essential for the sustainability of entire economies.

Consumption of natural resources such as coal and gas for generating and utilising energy is the basis of the prosperity of current industrialised countries. At the same time, it entails the emission of greenhouse gases such as carbon dioxide (CO_2), which are responsible for the scientifically substantiated climate change. Limiting the temperature rise to two degrees Celsius compared to preindustrial times is therefore the central objective of international climate policy. To allow this goal to be achieved, it would be necessary for the climate-damaging greenhouse gas emissions to decrease rapidly in the medium term. However, the opposite is happening. *Worldwide emissions of the climate-damaging greenhouse gas CO_2 reached a new record high in 2011*. According to estimates by the International Energy Agency (IEA), CO_2 emissions rose to 31.6 gigatonnes last year[11] (see Fig. 7, graphic analysis up to 2009).

The largest proportion of global emissions consisted of the carbon dioxide released by the combustion of coal (45 per cent), ahead of oil (35 per cent) and gas (20 per cent). While emissions rose strongly in the emerging economies, particularly China (see Fig. 9), they decreased slightly in the USA and in the EU due to the financial crisis. Whereas a trend towards further reductions in CO_2 emissions is emerging in the EU, emissions in the USA are increasing slightly once again.

The continuing rises in emissions underline the urgency of *restructuring the energy system* in order to mitigate climate change. Furthermore, there are only finite reserves of fossil fuels available. Long-term rises in energy prices are already signalling that our prosperity is jeopardised by the finite availability of raw materials (in spite of new discoveries of fossil fuels or new exploration methods) and that it can only be secured in the long term through regenerative energy sources. *Uncoupling economic growth from energy consumption* is a crucial hurdle that needs to be overcome in order to establish sustainable development. As one of the leading industrialised countries, Germany has embarked on this road in recent years in a step-by-step approach and is therefore under international scrutiny – particularly after the decision taken in 2011 to abandon nuclear power. Germany's industrial competence suggests that a transformation of the methods of production is possible. If this feat is achieved, considerable pioneering benefits beckon.

Emerging economies and developing countries are suffering particularly badly from climate change because they are less capable to adapt. In spite of this the emerging economies do not want to forego fossil fuels be-cause they represent the basis of further economic growth and therefore the chance of increased prosperity. The failure, to date, of attempts to achieve a globally binding climate protection treaty at the annual climate negotiations, which would include all CO_2 emitters, is an illustration of the diverging constellations of interests of industrialised countries and emerging economies. But as became apparent at the "Rio+20" conference, developing countries are also sceptical as to whether economic concepts such as that of the "Green Economy", which promote sustainability, are actually compatible with their economic policy of poverty reduction.

Fig. 7a: World CO_2 emissions** from 1971 to 2009 by fuel (Mt of CO_2)*

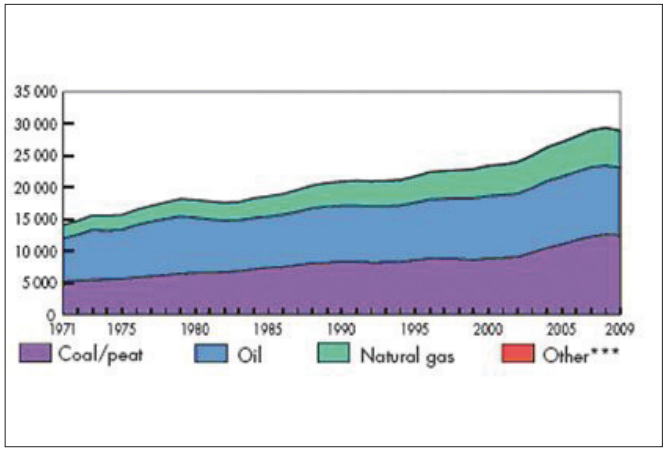
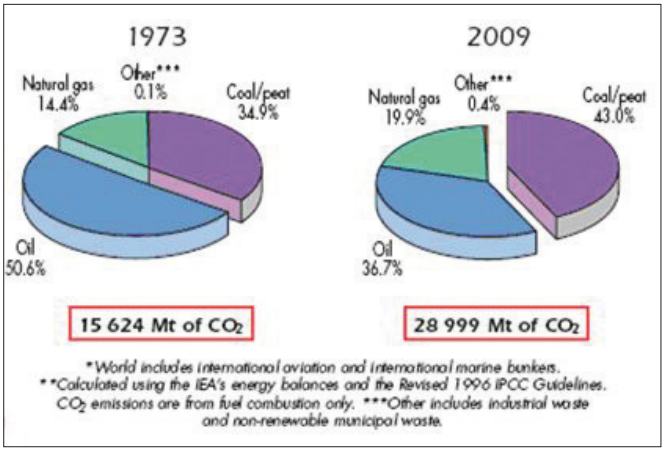


*Fig. 7b: 1973 and 2009 fuel shares of CO_2 emissions***



The graphic on the left illustrates the development of worldwide CO_2 emissions from 1971 to 2009 in billions of tonnes (Fig. 7a). In 2009, worldwide CO_2 emissions amounted to just under 30 billion tonnes. The graphic on the right shows the proportions of the individual fuels producing the emissions (Fig. 7b). In 1973, the combustion of oil produced 50.6% of the CO_2, followed by coal (34.9%) and gas (14.4%). In 2009, coal represented the highest proportion at 43.0% ahead of oil (36.7%) and gas (19.9%).
Source: Key World Energy Statistics 2011. International Energy Agency.
http://www.iea.org/publications/free_new_desc.asp?pubs_ID=1199.

Fig. 8a: World CO_2 emissions** from 1971 to 2009 by region (Mt of CO_2)*

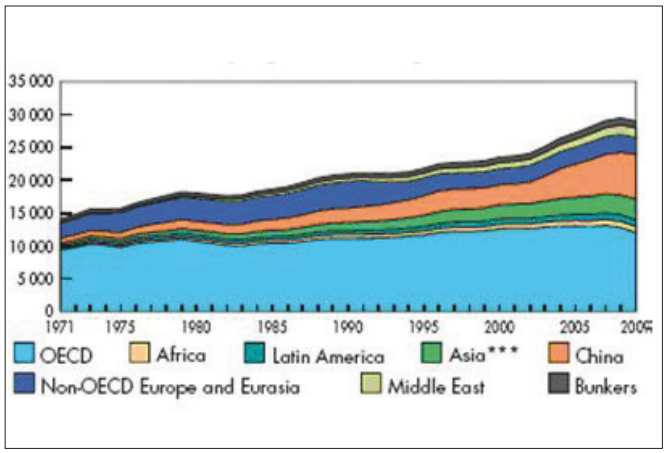
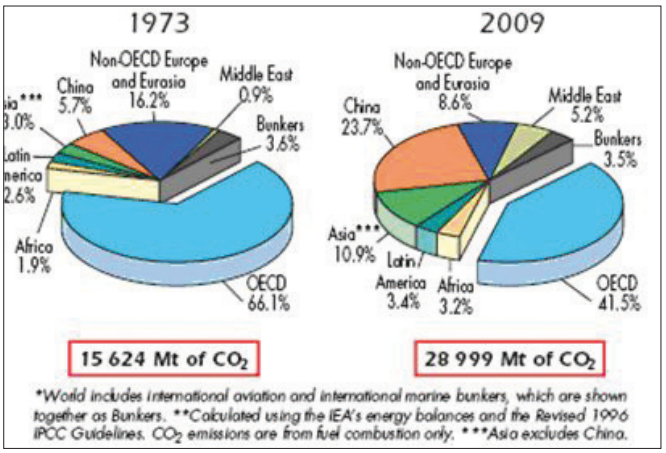
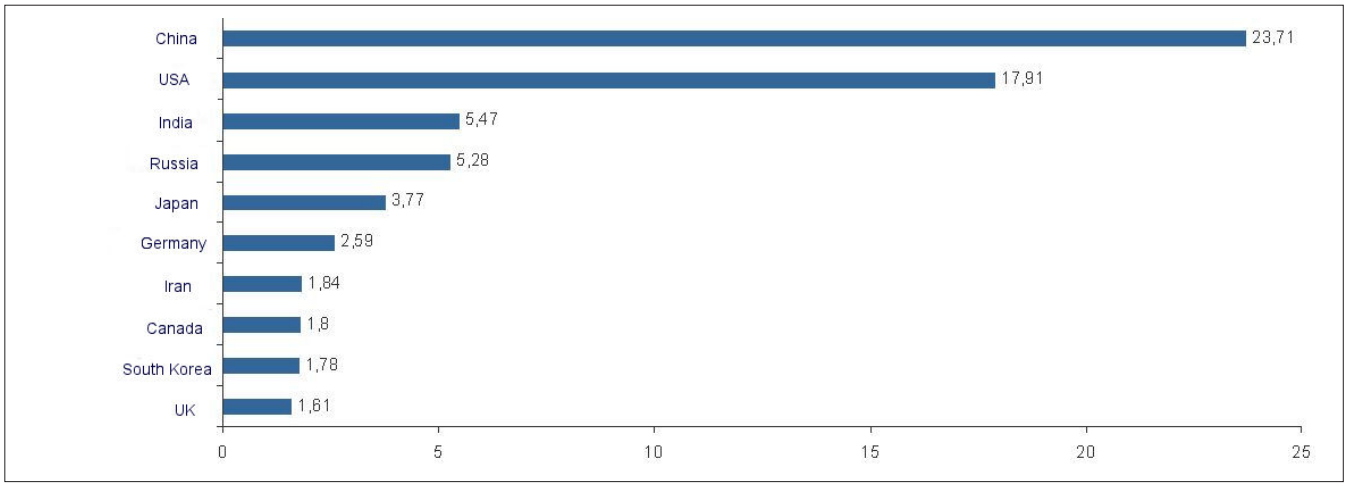


*Fig. 8b: 1973 and 2009 regional shares of CO_2 emissions****



The graphic on the left illustrates the development of worldwide CO_2 emissions from 1971 to 2009 in billions of tonnes broken down by region (Fig. 8a). The graphic on the right shows the regional emission proportions in 1973 and in 2009 (Fig. 8b). While the OECD world was responsible for 66.1% of worldwide CO_2 emissions back in 1973, its share sank to 41.5% in 2009. In 2009, countries such as China produced four times the emissions they generated back in 1973 (5.7%).
Source: Key World Energy Statistics 2011. International Energy Agency.
http://www.iea.org/publications/free_new_desc.asp?pubs_ID=1199

Fig. 9: The 10 largest CO_2 emitters by share of worldwide CO_2 emissions in 2011 (in per cent)*



* Energy-related. The statistic represents the proportions of worldwide CO_2 emissions in 2011 of the ten largest CO_2emitters. In 2011, China was the worldwide largest CO_2 emitter, accounting for 23.71%.
Source: Statista

After the sobering outcome of the conferences on the environment and sustainability over the last few years, the only hope left for a growing world population is that noticeable progress can be achieved through pragmatic, incentive-oriented and bilateral cooperation agreements between individual industrialised, newly industrialised and developing countries. In addition, efforts must be made to promote the idea that it can be in the economic interest of all countries to embark on a course of sustainable growth. Countries that recognise the need to re-orient the management of their economy (resource-saving, low-carbon) will gain decisive competitive advantages in a world of increasing shortages and new requirements.

There are numerous indicators suggesting that the next wave of innovations in the world economy will be based on resource-efficient and climate-friendly products and services. Be it new materials made from renewable raw materials, energy-saving processes, renewable energies or electric cars that rely on those energies to run. Green Business and low-carbon investments no longer represent a niche but probably the largest growth market of the global economy. (Internet-based) information and telecommunication technologies will play a decisive role in this.

Conclusion: *Our knowledge about climate change shows clearly that economic growth based on fossil fuels has side effects that are already jeopardising human life in some regions of the earth. Counteracting the impact of human economic activities for the long term would necessitate a reduction in CO_2 emissions of up to 80 per cent in industrialised countries*[12]*. To achieve anything like this target will require more intensive utilisation of the energy savings potentials (energy efficiency) and measures to get renewable energies ready for the market more quickly. And efficiency reserves in the global economic cycle will need exploiting as well. Meeting this complex challenge (involving no less than a reorientation of our entire system of economic management) will require engineering expertise and system knowhow in areas where German companies still have competitive advantages. On the basis of these capabilities, one may be able to demonstrate that it is possible to overcome the problem of finite natural raw materials using new technological approaches. In order for this to succeed there will need to be a regulatory environment that provides efficient support for sustainable development without imposing any prescriptions regarding hitherto unknown technologies and forms of energy utilisation.*

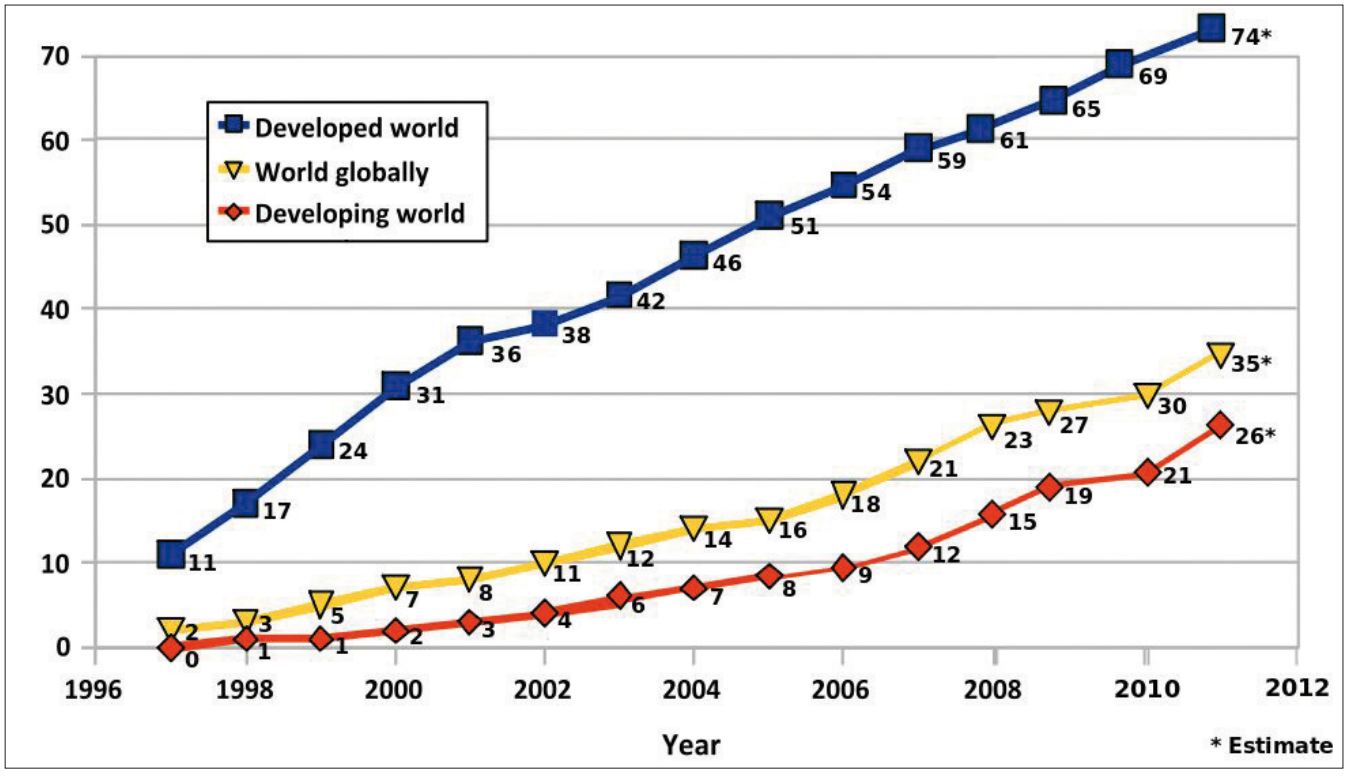
TREND FIVE: DIGITISATION WARPS, ACCELERATES, CONNECTS EVERYTHING

The ongoing digitisation completes globalisation by complementing the worldwide division of labour with an infrastructure that is fit for purpose but at the same time open to misuse. Technological developments are resulting in an ever-increasing flood of information, blurring the boundaries between work and private life, yet opening up entirely new areas of activity for companies at the same time.

From a historic perspective, the impact of digitisation in terms of its cultural consequences is probably comparable to that of the industrial revolution. *The increasing significance of the Internet and of information technology* is already being felt today and *influencing our economic structures* (e.g. the management of the flows of goods and services), *the way politics is conducted* (e.g. new transparency and forms of participation, new lines of conflict between online and offline worlds), *our working environment* (e.g. permanent accessibility, remote working) *and our leisure activities* (e.g. communication via social networks, TV-style entertainment offerings, gaming, online shopping). Digital technologies are driving social change and allow *all data and information to be available virtually simultaneously all over the world*. The significance of this low-cost global knowledge sharing cannot be overestimated – digital encounters turn into cultural relationships. The reactor disaster in Fukushima and the upheavals in the Arab world are examples illustrating that the "world has become smaller" (global impact).

Ever-increasing numbers of people are benefiting from the development towards a networked information and knowledge society. Since the introduction of Internet browsers, the number of Internet users and providers has experienced dynamic growth throughout the world (see Fig. 10). Today, the people who have access to the World Wide Web number over two billion already. Over 50 million people regularly go online in Germany alone. All over the world, people take the opportunity of accessing information at any time and of networking with colleagues and friends. The protection of personal data and privacy often takes a backseat, but carries considerable potential for misuse. Cyberattacks and "state Trojans" show that digital hazards do not necessarily originate in private initiatives. Some states are already influencing worldwide data traffic, restricting Internet access or censoring contents.

Fig. 10: Internet users per 100 inhabitants

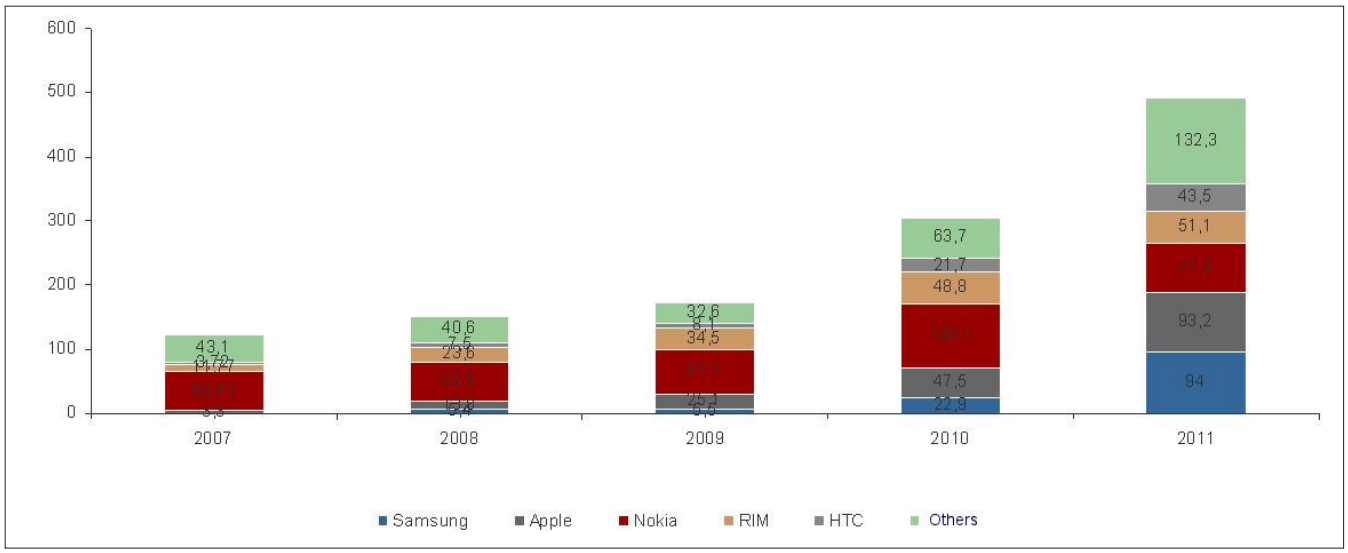


Internet use has proliferated over the last 15 years. In 2010, 30 out of 100 people around the world were familiar with using the World Wide Web ("World globally"), while it was close to 70 out of 100 in the industrialised countries ("Developed world").
Source: International Telecommunications Union

The digitisation trend has its origin in the rapid advances made in computer technology, especially in the areas of microprocessors, software, search engines and storage media as well as transmission capacities. Within just a few years, Apple, Google and Facebook have risen to become some of the "most valuable" companies of the world and thus powerful economic actors. Their products (smartphones/tablets) and services (GPS data searches, social networks) provide the foundation for previously unimaginable service offerings and business models. There is now an entire generation of entrepreneurs active in places like Silicon Valley, Bangalore and Berlin engaged in sniffing out new (digital) business areas. At the same time, new ways of using energy more efficiently, exploiting resources sparingly and protecting the climate are emerging for both companies and consumers thanks to new (Internet-based) information and communication technologies (Green IT[13]).

Experts assume that in future more people will gain access to the Internet via mobile phones (so-called smartphones) than any other medium (see Fig. 11). After all, mobiles are more affordable than computers and also more suitable for universal use thanks to their low power requirement. They also offer poorer people the opportunity of catching up to modern information technologies – assuming the appropriate infrastructure is in place.

Fig. 11: Worldwide sales of smartphones by manufacturer from 2007 to 2011 (in million units)



The timeline shows the number of smartphones shipped worldwide by manufacturer in the period from 2007 to 2011. In 2011, Samsung sold 94 million smartphones.
Source: Statista

According to statistics of the industry association BITKOM, 11.8 million smartphones were sold in Germany alone in 2011[14]. That corresponds to a year-on-year increase of 31 per cent. Smartphones are not only used to make phone calls, but also serve as MP3 players, satnavs or devices to browse the web. At the World Wide Developers Conference 2012 in San Francisco, Apple boss Tim Cook illustrated what the future of the mobile all-rounders might look like. According to him, smartphones will also be used as payment vehicles or as boarding passes for scheduled flights in the near future. The networking of smartphones and their ability to receive GPS signals also allow them to be used in the car, where they might do away with the need for satnav, CD player and radio.

The data required for all these processes will also reside on the Internet in the future. Through the use of cloud computing, they can be accessed as and when required because they are stored on central servers, the data cloud. This offers the great advantage that processor performance can be made available to suit demand. Cloud computing provides economic benefits particularly to small companies since they don't need to acquire expensive hardware and only need to pay for the storage space they actually require.

Conclusion: *The boom in information and communication technologies is not just a fad, but based on massive economic benefits. Rapidly decreasing transaction costs and new value chains mean that Internet-based technologies can be used to achieve enormous gains in productivity. And the market potential has not been fully realised by any means, because the networking of "offline products", such as cars, electrical devices, clothing and buildings, has only just begun. The same applies to industrial software and control technology, which already allow companies to operate with minimal physical effort today. The media landscape and the education sector of industrialised countries are facing considerable upheaval. The impacts can already be studied in the retail trade today. For emerging economies and developing countries, digitisation opens up opportunities for new departures in economic, social and political areas. One downside is that there are energy-dependent "critical infrastructures" being created, which are susceptible to criminal activity. The misuse of data also represents a growing hazard.*

1| *Cf. Radermacher, Franz Josef (2011): Welt mit Zukunft. Murmann Verlag, Hamburg*
2| *Niall Ferguson, Der Westen und der Rest der Welt, p. 13*
3| *Term for frugality used in economic contexts (lat.* austeritas*).*
4| *Achleitner, Paul (2011): "Es wird eine neue Zeitrechnung geben."*
5| *http://www.spiegel.de/wirtschaft/unternehmen/allianz-vorstand-zu-megatrends-es-wird-eine-neue-zeitrechnung-geben-a-740181.html*
6| *The American economic pacts, which were established in the course of the economic and financial crisis to revive the struggling labour market, have contributed considerably to this development.*
7| *IMF (2012): World Economic Outlook Update. New Setbacks, Further Policy Action Needed. July 2012. http://www.imf.org/external/pubs/ft/weo/2012/update/02/index.htm*
8| *http://www.pewglobal.org/2012/07/12/pervasive-gloom-about-the-world-economy/*
9| *United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects: The 2010 Revision. http://esa.un.org/unpd/wpp/Documentation/publications.htm*
10| *http://royalsociety.org/policy/projects/people-planet/report/*
11| *Balkenende, Jan Peter; Merkel, Angela (2009): Values for a Sustainable World Economy.*
12| *http://www.spiegel.de/international/world/opinion-values-for-a-sustainable-world-economy-a-614251.html*
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16| *http://www.bitkom.org/71858_71854.aspx*