

EDUCATION FIRST!

From Martin Luther to
Sustainable Development



WOLFGANG LUTZ
REINER KLINGHOLZ

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FROM MARTIN LUTHER
TO SUSTAINABLE DEVELOPMENT

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Hendrik Geyer
STIAS Director
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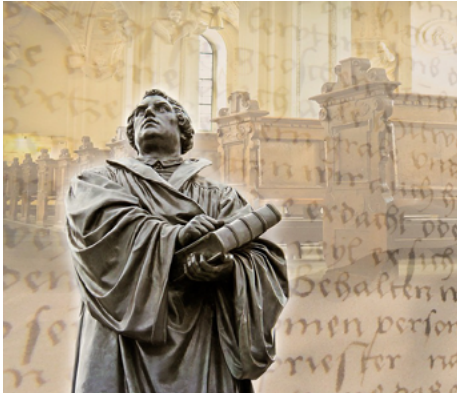
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PROLOGUE

Education, its enemies and the future of humanity

Few people in developed countries would dispute the importance of education in our lives and those of our children. We need education in order to be professionally successful, to broaden our horizons, to be able to question the status quo and to choose what kind of life we want to lead. Education even allows us to influence our health. Indeed, education is what enables us to lead a self-determined existence at all. It is fundamental for the complex organisation of modern societies and it serves higher goals such as freedom and justice. Better-educated people become more involved in political decision-making processes, thus helping to further democracy. In most countries across the globe extending education to broad sections of the population by following the principle of “education for all” and seeking the attainment of ever higher qualifications has brought about a marked improvement in living conditions over a period of decades or even centuries. All over the world the prosperity of nations is closely connected with their citizens’ level of education. For this reason modern societies are also called knowledge societies.

However, because education began to spread at different times in different parts of the world and under very different conditions, the extent to which countries have travelled along the road to becoming knowledge societies varies enormously. Not all nations have been equally successful in disseminating knowledge and harnessing it for the good of the community. Western industrialised nations reaped their education dividends early on; emerging Asian nations followed later, but with greater momentum. In other parts of the world, above all in Africa, in parts of Western Asia and in the Arab world, the prospects offered by education have remained largely unexploited. Educational opportunities remain limited. Many children, particularly girls, do not go to school at all or stop their schooling at an early age. The percentage of illiterates is still shockingly high. These countries therefore have little chance of competing globally. Their development is sluggish, decent jobs are in short supply, social change is inhibited and their populations are growing rapidly, for it is a global phenomenon that lack of education leads to high birth rates. The burgeoning younger generations see the success of other countries and feel cheated out of their future.

No wonder then that dissatisfaction is growing under such conditions. And as it increases, so does anger towards those cultures that have been able to benefit from education. In many cases ideological and religious arguments are then advanced to explain the differences between cultures, and backwardness is interpreted as the consequence of oppression, imperialism and exploitation.

When we talk about education in this book, we are not referring to the humanist education ideals espoused in the early 19th century by, for example, the German philosopher Wilhelm von Humboldt, but rather to basic cognitive skills – in other words, the “three Rs”: reading, writing and basic arithmetic. Acquiring these skills advances our ability to think abstractly, gives us the wherewithal to acquire and classify other knowledge and makes it easier for us to plan our lives. It enables women and men in all countries and cultures to help themselves as well as others in meeting life’s challenges, and offers people new opportunities to shape their social, economic and cultural lives. Education opens the door to new freedoms.

But these freedoms can also give rise to fears: rulers fear what might happen if people gain more control over their lives; religious leaders fear rational, secular ways of explaining the world; and men fear independent women.

Because modern education and science have their roots in the “Western” world, which was heavily influenced by Christianity, their successful manifestations are often classified in other parts of the world as arrogant, decadent and impure, as the products of a “false” faith. The tried and tested principles on which Western societies are based, such as equality, enlightenment, pluralism and rationalism, are

alleged to be the cause of unbelief. Only believers' own "true" faith is thought to be capable of resolving the dilemmas of the modern world: environmental and financial crises, greed and the capitalist pursuit of profit for its own sake.

Ignorance as a concept

Such arguments provide a breeding ground for the dissemination of absurd and even dangerous ideologies. Often under the guise of religion, proponents of such ideologies combat anything that smacks of "Western" dominance, instead preferring to return to the roots, to the fundamentals of their faith, even though these date from a completely different era. A resistance to modern education, which is regarded as the source of all unbelief, often lies at the heart of their rejection of "the West". In their attempt to curb unbelief, the natural sciences are the first subjects to disappear from school curricula, with religious instruction taking their place. Often, however, the interventions are much more radical than this and hatred of the modern world explodes into terror and violence. In a growing number of countries schools are going up in flames, girls are being excluded from learning and women are banned from public life.

People in the West and a majority of those in other parts of the world find these ideas and the resistance to modern education completely incomprehensible. What reasons are there, they ask, to reject ways of life that have been proven to enable a better existence and to "free the spirit"? Why would anyone want to preserve a society that discriminates against half its citizens and restricts everyone's freedom?

Yet the terrorism of religious fanatics is only one reason why parts of Africa, the Middle East and Asia have experienced little of the global expansion of education. For fanaticism can only spread where the ground is prepared for a culture of ignorance, namely in those countries that have invested little in education, where governments regard universal education as unnecessary, and where in some cases they have even deliberately suppressed education out of a fear that better-educated people will demand greater freedoms and more participation.

Religious fanaticism attracts most of its followers in places where many people live in poverty, where ignorance reigns and where few people are capable of using arguments to defend themselves against the ideology of terror. In these places/regions many tacitly support the fanatics, believing that the enlightened, secular social model may rob them of their identity. Even if the leaders of the so-called Islamic State, Al Qaida or Boko Haram in many cases have a good education themselves, they need an army of ignorant hangers-on whom they can easily manipulate and use as cannon fodder in order to bolster their own power.

Lack of education thus breeds lack of education, and it apparently also breeds a large number of children, because in societies with a low level of education the birth rate is especially high. The gap in development between the better- and worse-qualified sectors of the global population is thus becoming ever wider, so that at the beginning of the 21st century the divide is no longer between East and West, or North and South, but between two fundamentally different educational cultures – a knowledge society and an anti-knowledge society. While for the former education constitutes the source of further progress, people living in the latter are denied the chance of benefiting from education by uninterested governments, while religious fanatics literally destroy any remnant of an education landscape.

This confrontation divides the world much more sharply than the clash of civilisations proposed by the American political scientist Samuel Huntington in the 1990s. After the end of the Cold War era and the bipolar world associated with it, Huntington had expected new lines of conflict to emerge between states based on different cultural and religious traditions, for example, between China as an emerging nation and the United States, or between the Islamic world and the West.

Many of today's crises suggest that what is behind the obvious new conflicts is a lack of investment in education rather than religious or cultural traditions. For in places where education has led to a certain level of prosperity and social freedom, and where birth rates have consequently fallen and demographic pressure has been reduced, states have become much more peaceful and resistant to crisis. This has little to do with culture or religion, for the same social progress can be observed in a range of countries, regardless of whether a majority of the population is Christian, Muslim, Hindu or atheist, as well as in multi-ethnic societies. Where, on the other hand, people's opportunities are limited by a lack of education, social progress stagnates and frustration with a desperate situation is likely to be vented in violence and fanaticism. The lines of conflict in the 21st century run between those who promote education and those who obstruct it. Huntington's clash of civilisations is in reality a clash between different cultures of education. When a "culture" of ignorance gains the upper hand, the future of humanity looks bleak.

Because education leads to greater prosperity and better health, while ignorance leads to poverty, conflicts and high population growth and tends to shorten lives, the two cultures are drifting ever further apart. Thus, unfortunately, the probability is growing that ever greater numbers of people losing out on education will gather under the flag of fundamentalist religion and fuel existing conflicts. The rapid spread of religious terror to more and more countries in the less developed world is an alarming indication that the clash between opposing cultures of education is intensifying – and this is a clash that affects all of us.

Excluding people from education is an age-old political strategy used by authoritarian regimes and dictators to try to stabilise their rule. Precisely because education makes people independent and self-confident, it has always posed a threat to those trying to hold on to power by oppressive means. The elites of the ancient civilisations, from Babylon to Rome, from Egypt to Confucianist China, from the Maya to the Aztecs, were all very happy with a situation in which only a small number of their populations were well educated, while the rest (e. g. peasants, soldiers or slaves) were subject to exploitation and manipulation. These autocratic social models remained the norm until the 18th century when – after a couple of isolated attempts in ancient Athens and later in small countries such as Iceland and Switzerland – the first modern democracies came into being. The “rule by the people”, or “government of the people, by the people, for the people”, as Abraham Lincoln once defined it, could only function once male citizens (for female citizens did not play a role until later) were capable of administering this kind of government in a responsible way. This required a certain level of education.

At some point in history education changed from being an elite to a mass phenomenon and became a successful model. How did this come about? There had been many attempts in this direction, in ancient Greece, for example, in Renaissance Italy, or by the European humanists. But the first real revolution in education based on the principle of “education for all” did not come until Martin Luther’s Reformation.

Luther was convinced that human salvation was only possible through a personal relationship with God, which in turn could only be achieved if believers were able to read the Bible for themselves. But it was distributed in Latin – a language understood only by scholars and priests. That was why Luther translated the Bible into a German vernacular that ordinary women and men could understand. However, because few people were able to read or write at that time, Luther first demanded the establishment of schools – for both boys and girls. He thus laid the foundations for the democratisation of education and for the later economic and political liberation of the people. In advocating individual faith, the Reformation inadvertently ushered in secularisation and individualisation, although neither were consciously planned or desired by Luther, who was in fact concerned only with religious, not secular, liberation.

Even if it took another two centuries after Luther for this liberation to come about, the combination of education and democracy became an unbeatable recipe for success. Greater equality and the acquisition of basic knowledge by as many members of the community as possible advanced the spread of technical and medical innovations, generating opportunities and income for broad sections of the population. They in turn spent the money they earned, boosting the economy

and raising tax revenues. As education and prosperity became widely established in democratic societies, they grew into flexible and efficient economic systems that enjoyed more success and stability than others.

Interestingly enough, the spread of education, enlightenment, political emancipation and prosperity over the centuries followed pretty much exactly the same path as the Reformed faith. What later came to be known as a “Western education” spread through Prussia, the Netherlands, Scandinavia and Great Britain to the United States. The once powerful Catholic colonial powers Portugal and Spain, not to mention Italy, lacked mass movements for education and steadily lost influence to these Protestant powers. The Arab world, too, which until well into the 11th century had been a cradle of the arts and sciences, fell far behind – not least because for 300 years it rejected book printing, the instrument that enabled the dissemination of knowledge to really proliferate.

In the 20th century, as other countries began to adopt the ideals of Western education, religion completely lost its significance. For as the pattern of development of the successful nations became clear, others simply wanted to copy them. As soon as education reached the masses, it unleashed the same power everywhere, regardless of whether the population was Protestant, Muslim, Hindu or atheist. By following this model, the small and once impoverished island of Mauritius achieved the highest level of development in Africa. Japan ended its isolation and became an economic and technological powerhouse. Singapore rose from a malaria-infested swamp to become a high-tech metropolis. China with its billion-strong population recovered within a very short space of time from the worst consequences of the communist planned economy and is now set to become the world’s leading economic power. In every case it was investment in human capital that set development in motion.

The term “human capital” is sometimes seen as having negative connotations, because it is perceived as degrading human beings to nothing more than an economic factor. In fact, though, this term denotes the abilities and skills that people possess to shape their lives. These are concentrated in people’s heads, *caput* being the Latin word for head. Human capital thus refers to the individual resources that each person can call his/her own, independently of ownership of material goods. Only those who possess this kind of capital and decide freely how to use it are able to enjoy the many benefits of education, from earning a higher income to wide-ranging protection from poverty and unemployment, better health, a longer life, and most significantly of all, the opportunity to shape their lives individually.

Knowledge and education are among the few resources that multiply with use rather than becoming exhausted. Open knowledge societies offer the only chance

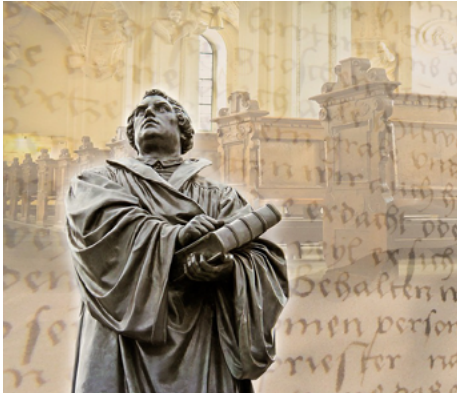
of finding an answer to the global challenges of the 21st century. How will humanity be able to escape the dangers of population growth and climate change without sufficient education? How will it provide a secure source of food for nine, ten, or eleven billion people? How will it overcome the drinking water shortages that threaten many regions of the world? How will it preserve biodiversity? How will it do any of these things, if not by finding intelligent solutions that are most likely to emerge from a highly educated population?

How the world will continue to develop remains an open question, for we do not know if and when the successful model of education will spread to those countries that so far have benefited little from the education revolution. In this book we therefore describe various scenarios of what the future of humanity might look by the end of the 21st century, depending on the level of investment in education. The scenarios range from rapid, peaceful and sustainable development to total stagnation, to a world with rapid population growth in the poorest regions, to the further spread of conflict and terror, to enormous environmental problems with climate change spiralling out of control.

Despite all the lip service paid to education, currently only between 2 and 4 percent of international development cooperation budgets are earmarked for basic education. Here our ideas need to be revised radically. Just as Martin Luther once campaigned for literacy for peasants and tradesmen, so today all children in developing countries must have the chance to attend school at least until the age of 16. Only then would they be able to set their countries on the path towards sustainable development.

Societies that reject education are in danger of succumbing to the cycle of deprivation, underdevelopment, poverty, terror and chaos. Their internal conflicts will threaten their neighbours and ultimately the rest of the world. Even if at first glance education is a sure-fire success, there is no guarantee that it will also reach the less developed parts of the world and help to solve their problems.

In this book we set out to show how and when education became a successful model for human development and which actors assisted in the process. We outline the benefits to be derived from education for each individual and for societies as a whole. And we show why, despite these benefits, too little is being invested in education and why in many places education is not only neglected but actually suppressed. We make clear what consequences the current clash of education cultures will have for tomorrow's world and why education is the key factor for ensuring the future of humanity.



I

THE CLASH OF EDUCATION CULTURES

Are girls allowed to go to school?
The attack on Malala

On 9 October 2012, shortly after midday, a white Toyota TownAce pushed its way through the noisy, chaotic traffic in Mingora in northern Pakistan. Mingora is the largest city in the long Swat Valley, a region known as the Switzerland of the East on account of its natural beauty and its clear views of the snow-covered mountains of the Hindu Kush. It is inhabited entirely by Pashtuns. The minibus, fitted out with wooden benches and dirty plastic sheeting for windows, had just picked up twenty schoolgirls and three teachers from the Khushal School to bring them home. Crammed together in the muggy heat, the girls were clutching their exam files on their laps, for they were in the middle of their final exams. The bus followed the same route it did every school day, turning right at a military checkpoint, then past an abandoned cricket ground, when it was suddenly stopped by a masked young man. He asked the driver whether this was the Khushal school bus, although this was plainly written on both sides of the vehicle. In the meantime, a second man wearing a woolly hat, his mouth and nose covered by a scarf, had swung himself up onto the tailgate and asked: “Who is Malala?” As several girls turned their gaze to

one of their classmates, the only girl not wearing a veil, the man pulled out a black Colt and shot the 15-year-old girl at close range in the head. Narrowly missing her left eye, the bullet lodged itself near her shoulder blade. Two other girls were also hit by bullets, but not seriously wounded.

Girls have a hard time in this part of the world. When a daughter is born, family and friends are not exactly overjoyed. Most Pashtuns shamefully hide new-born baby girls behind a curtain, whereas the arrival of male offspring is celebrated by firing a round of shots. Many girls are married off before they reach the age of majority, often to much older men. Following a banned, yet still often practised custom, some families give away their daughters to other tribes in order to resolve disputes. And since the radical Islamist Taliban have spread to the Swat Valley from neighbouring Afghanistan, they have demanded that women wear the Burka. The Taliban will not tolerate women at the bazaar, indeed they are not even allowed to set foot outside the house unless accompanied by a male member of the family.

This is the environment in which Malala Yousafzai had grown up and yet she turned out to be a most unusual child. Like many adult women, her mother could neither read nor write. Her father, an English teacher and a peace activist, founded his own private secondary school in 2003, naming it after Khushal Khan Khattak, a 17th-century poet and warrior who tried to unite Pashtun tribes against the Mughal Empire, which at that time ruled over almost the entire Indian subcontinent.

The school became like a second home for little Malala. By the age of 4 she was already listening in on lessons for much older children. As soon as she had learned to read, she devoured every book she could get hold of, which in their modest household were not very many. Once she finally went to school she quickly became top of the class and then of her year. She soaked up knowledge from every discipline, from physics to politics. She once wrote that the entrance to the Khulal School was like a “magic door into another world”.¹

As the Taliban gained influence, the self-proclaimed local *mufti* ordered Malala’s father to close the school, arguing that it contravened Islam, as schools for girls were allegedly blasphemous. Girls were supposed to wear veils and remain concealed from public view. The Taliban banned television and music, dancing, singing and children’s games. Piles of television sets, computers, music cassettes and DVDs of Bollywood films were burned in the streets. The Taliban’s next move was to ban the health service from administering polio vaccinations, because healing diseases before they had broken out contravened sharia law. Then they began to destroy schools; by the end of 2008, hundreds of schools had been blown up. The Taliban

1 Yousafzai, M. and Lamb, C. (2013): *I am Malala: the girl who stood up for education and was shot by the Taliban*. London: Weidenfeld & Nicolson.

also bombed the local power station, cutting off the electricity supply. They blew up bridges and gas pipelines; the water supply broke down and people died of cholera.

By this time Malala was 11 years old and was in despair that she could no longer go to school. She comforted herself by reading the book *A Brief History of Time* by the British physicist Steven Hawking, who speculated about whether natural forces would allow time to flow backwards. Malala wished it would, for then the Taliban would disappear and the school would open again.

Around this time, a BBC radio correspondent, Hai Kakar, came up with the idea of having a girl write an anonymous diary about life under the Taliban. Seeking out the director of a private school to act as an intermediary, he chanced on Malala's father, Ziauddin, who introduced the BBC man to his daughter. On the telephone Malala told him about the Pakistani military helicopters which thundered across the Swat Valley looking for Taliban, about the artillery fire in the mountains that kept her awake at night, about her fears that her beloved school could become the target of an attack, but also about the fact that children loved the burka, because a veil covering the whole body was great for playing dressing up. Only on the street it was impossible to know whether the burka might be concealing a suicide bomber.

Malala's reports appeared as a blog on the BBC Urdu website under the pseudonym Gul Makai.² Some daily newspapers published printed versions of the blog and BBC radio broadcast them using another girl's voice. Nobody except Malala, her father and the reporter knew who Gul Makai really was. But while continuing to write this anonymous blog Malala also began giving interviews on radio and television, and soon became known all over Pakistan. She countered the Taliban accusation that education was un-Islamic and that it Westernised people with the argument: "Education is neither Eastern nor Western, education is human".

Malala even managed to meet Richard Holbrooke, US special representative for Afghanistan and Pakistan, and tell him the Americans should take steps to ensure that girls in the Swat Valley could go to school again. And indeed, through a combination of pressure and financial support from the United States the Pakistani military managed to force the Taliban to retreat and something resembling everyday life returned to Mingora. In the meantime Malala had become a political figure. On the one hand, the government needed her as an icon against the Taliban, and in 2011 the 14-year-old girl was awarded Pakistan's first ever National Youth Peace Prize. Yet at the same time the authorities were also suspicious of Malala and her father's quest for education and freedom, and ordered the secret services to spy on the family.

2 BBC News (19 Jan 2009): Diary of a Pakistani schoolgirl, http://news.bbc.co.uk/2/hi/south_asia/7834402.stm

Through her mixture of youthful naivety and conviction that she was doing the right thing, Malala had already turned herself into a target for the Taliban. Like her father, she regularly received death threats. “Both are spreading secular knowledge and must be killed”, was the message the Taliban sent via the internet. But father and daughter alike were determined not to give up. They refused to have bodyguards and were determined to stay in the Swat Valley and continue their fight for education.

All this changed abruptly after the attack on the school bus on 9 October 2012. For several days after the attack Malala was fighting for her life. She was given emergency treatment in various hospitals in Pakistan and eventually flown to the Queen Elizabeth Hospital in the British city of Birmingham. In this hospital, which specialises in treating wounded British soldiers, Malala underwent a series of complicated operations and plastic surgery to reconstruct her skull and she eventually recovered.

On 13 July 2013, her 16th birthday, she gave her first public speech since the attack. Addressing the United Nations in New York, this slightly built girl displayed an impressive command of rhetoric as she appealed in a clear, high voice for people to take up the fight against terror by means of free access to education for all the world’s children: “The extremists were and they are afraid of books and pens. The power of education frightens them. They are afraid of women. The power of the voice of women frightens them.”³ She continued her line of argument when she visited President Barack Obama in the White House, telling him boldly and freely to his face that it was better to fight terrorism through education than through war. In December 2014 the King of Norway awarded Malala the Nobel Peace Prize; she was the youngest ever recipient.

The reactions in Pakistan were extremely divided. While Prime Minister Nawas Sharif celebrated Malala as “the pride of Pakistan”, some newspapers called her an agent of the CIA. Others alleged that her father had engineered the attack in order to make his daughter a heroine. Tariq Khattack, a former reporter for the daily newspaper *Pakistan Observer*, condemned the Nobel Peace Prize as part of a Western conspiracy, calling Malala a useless type of girl who simply sold what the West would buy. There was also massive criticism from Mirza Kashif Ali, the president of the All Pakistan Private Schools Federation. In protest he proclaimed an “I am not Malala day” and banned her biography from all the federation’s schools, arguing that the book did not respect Islam. Not least because of such hostility, Malala, her two brothers, and her parents have prudently refrained from returning to their home in Pakistan since arriving in Birmingham.

3 Malala Yousafzai addresses United Nations Youth Assembly, <https://www.youtube.com/watch?v=3rNhZu3ttIU>

Boko Haram, “Islamic State” and similar movements: education under attack

The attack on Malala is just one example of the rampant educational and cultural vandalism holding much of the world in its grip. In many regions, particularly in less developed states which often have a majority Muslim population, society’s marginalised social losers are gathering under the flag of religion. In reality they are losers in education who have lost touch with the modern world and are looking for an “enemy” – one that they find in a “Western” culture they define as arrogant and decadent. The inner logic of this ideology, combined with a medieval interpretation of the Koran, inevitably produces an alternative model to Western society – a model that involves bombing schools, denying girls education, confining women to their homes, and destroying ancient cultural treasures because they are allegedly “graven images” from the era before Mohammed, the prophet of Islam.

This ideology has found an ever-increasing number of supporters in recent years. In 2014 the so-called Islamic State (IS), the largest terrorist organisation in terms of geographical distribution, proclaimed a caliphate in Iraq and Syria. Since then it has managed to gain a foothold in Libya, Egypt, Tunisia, Yemen and Lebanon as well as form alliances with terrorist organisations from other countries. The UN High Commission for Human Rights has already classified IS’s acts of violence, organised torture and sexual slavery as “genocide”.⁴ For children and young people IS terrorism has frequently meant the end of regular schooling. Instead, they are sent to religious schools where the teachers are compelled to teach according to new IS “curricula”. This involves not only separate instruction for boys and girls but often ideological brainwashing, attendance at public beheadings and stonings, and training in the use of weapons.⁵

The 250-page report “Education under Attack”, compiled by organisations including Human Rights Watch, Save the Children, UNESCO, UNICEF and others, lists the locations in the world where it is most dangerous to attend school and where attacks by terrorists, soldiers or drug gangs prevent millions of children from learning. The 13 worst-affected countries in the period 2009 to 2013 were mainly states in which Islamic groups oppose the basic right to education. They include Afghanistan,

4 Human Rights Council (2015): Report of the Office of the United Nations High Commissioner for Human Rights on the human rights situation in Iraq in the light of abuses committed by the so-called Islamic State in Iraq and the Levant and associated groups. http://docs.dpaq.de/8711-ohchr_report_iraq_-_18.03.2015_embargoed.pdf

5 Boom, M. (2015): Cubs of the Caliphate. The Children of the ISIS. *Foreign Affairs* July 21, 2015, <https://www.foreignaffairs.com/articles/2015-07-21/cubs-caliphate>

Pakistan, Nigeria, Yemen, Iraq and Somalia.⁶ The United Nations lists a total of 70 countries in which girls are prevented from attending school.⁷

Take Nigeria, for example, where the Islamic group Boko Haram has been terrorising the population for over ten years. A rough translation of Boko Haram would be “Western education is a sin” or “Books are a sin”. In the region where they exert influence, the jihadists, who are now militarily very well equipped, forbid any social or political activity reminiscent of a Western way of life. The natural sciences are regarded as un-Islamic and school pupils are limited to learning verses from the Koran in Arabic, a language that they do not understand. Most of the children who have attended a Madrasa, a religious school, leave school with limited education. Boko Haram controls large parts of northern Nigeria and has meanwhile gained a foothold in the neighbouring states of Niger, Chad and Cameroon. Between 2012 and 2013 alone the group burned down more than 300 schools.⁸ In 2011 the University of Maiduguri, a city with over a million inhabitants in the north-east of the country, had to be closed temporarily following Boko Haram attacks. In February 2013 the terrorists shot nine members of a vaccination team. In April 2014 they kidnapped more than 200 girls from the government secondary school in Chibok, saying they were going to force them to marry. In other places girls wearing belts of explosives have been sent into crowds and the explosives were then remotely detonated. Boys are captured, subjected to brainwashing and forced to become child soldiers. Attacks occur on a daily basis and the number of victims has risen sharply over the years. In 2014 almost 8,000 people lost their lives as a result of Boko Haram terrorism. In early January 2015 around 2,000 people died in attacks on the towns of Baga and Doron Baga.⁹ Since then the attacks have become even more frequent and brutal. According to the World Bank, the terror has internally displaced some 1,8 million persons, while 15 million people in the region have been impacted by the crisis.¹⁰

6 Global Coalition to Protect Education from Attack (2014): Education under Attack. http://protectingeducation.org/sites/default/files/documents/eua_2014_full_0.pdf

7 United Nations (2015): Background Paper on Attacks Against Girls Seeking to Access Education. http://www.ohchr.org/Documents/HRBodies/CEDAW/Report_attacks_on_girls_Feb2015.pdf

8 Human Rights Watch (2014): World Report 2014: Nigeria, <http://www.hrw.org/world-report/2014/country-chapters/nigeria>

9 FDD's Long War Journal: Boko Haram, <http://www.longwarjournal.org/boko-haram>

10 World Bank (2016): World Bank Scales up Support for Nigeria's North-East Region, Press release, Washington D. C., <http://www.worldbank.org/en/news/press-release/2016/06/07/world-bank-scales-up-support-for-nigerias-north-east-region>

In 2012, approximately 2,000 kilometres north-west of northern Nigeria, supporters of the extremist group Ansar Dine (“defenders of Islam”), which has links with Boko Haram and the Maghreb branch of Al Qaida, entered the Malian city of Timbuktu.¹¹ In the 15th century the desert city was an oasis of learning, scholarship and literature, and as a UNESCO World Cultural Heritage site has preserved the most important historical monuments and artefacts of this era. Ansar Dine destroyed mosques, shrines and the graves of famous Islamic scholars, and set fire to parts of the newly constructed Ahmad Baba Institute, in which around 300,000 Islamic manuscripts dating back to the 13th century were preserved. The Islamists even attacked their Muslim brothers and sisters, stoning and beheading them on the grounds that they belonged to the “wrong” – i.e. the mystic Sufi – branch of Islam.¹²

In Iraq and Syria IS fighters have destroyed numerous Islamic shrines using bulldozers, dynamite and grenades, including the Naubu Younis mosque in the Kurdish city of Mosul, the monumental statues of Abu Tammam, one of the greatest Arab poets of the Middle Ages, the tomb of Ammar ibn Yasir, once one of the closest confidants of the prophet Mohammed, and the ancient temple of Baal Shamin in the Syrian city of Palmyra, which even survived the Mongol raids and invasions in the 13th century. They justified the destruction on the grounds that these buildings promoted the “un-Islamic” worship of holy figures.

As is almost always the case, the jihad (holy war against unbelievers) proclaimed by radical Islamists, which actually seeks to challenge “Western” domination, has here once again been directed against their own people. The vast majority of victims of Islamic terrorist groups are Muslims. Indeed, 60 percent of those who have died in terrorist attacks in the past ten years were citizens of Iraq, Afghanistan and Pakistan,¹³ whereas the real “enemy” in the West has remained relatively unscathed.

780 million illiterates

The sobering data gathered by UNESCO (the United Nations Education, Scientific and Cultural Organisation) show just how dramatic the situation is, particularly for young people: worldwide, 58 million children between the ages of 6 and 11 are not attending primary school, most of them in sub-Saharan Africa. But in the rest of Africa too as well as in the Arab world the number of children who are sent to school

11 Solomon H. (2015): *Terrorism and Counter-Terrorism in Africa. Fighting Insurgency from Al Shabaab, Ansar Dine and Boko Haram*. Basingstoke: Palgrave Macmillan.

12 FAZ (10 Jul 2012): Zerstörung in Mali: Es war einmal Timbuktu, <http://www.faz.net/aktuell/feuilleton/zerstoerung-in-mali-es-war-einmal-timbuktu-11813564-p3.html>

13 Schiermeier, Q. (2015): Attempts to predict terrorist attacks hit limits. *Nature News* 517 (7535): 419.

is well below the global average. And even in poor countries where children are able to go to school, the teaching methods are usually antiquated, with the teacher standing at the front and lecturing to the class while the children remain silent, so that few girls or boys learn to ask critical questions.

Nowadays primary school education alone does not equip young people sufficiently to pursue a professional career. At the very least, they would need a basic secondary education – roughly equivalent to GCSE level in the UK. Yet worldwide 63 million young people of lower secondary school age do not attend school.¹⁴ That is around 8 percent of all young people of this age. In Africa and in South and West Asia the figure is around 14 percent. Among adults the situation is even worse: because they are long past school-going age they have been unable to benefit from recent efforts to improve education. While worldwide around 780 million people are considered to be illiterate, the number of functional illiterates – people who can read individual words but cannot understand the meaning of a simple sentence – is much higher. And quite a few of them do not even live in the poor parts of the world but in highly developed states.

Almost two thirds of illiterates are women, a proportion that has not changed since 1990. The number of women worldwide who cannot read or write is equivalent to the population of the entire European Union. In Pakistan alone, the home of Nobel Peace Prize holder Malala Yousafzai, there are 70 million illiterates, 50 million of them women. This effectively excludes them from public life: they cannot read newspapers or use the internet, they cannot read contracts, instruction manuals or bus timetables, and they do not understand what is written on election posters, medicines, bags of fertiliser, traffic signs or price tags.

Because of high population growth and the fact that at least half of all children either do not complete even five years of primary schooling or do not attend school at all, the absolute number of illiterates in Pakistan is actually growing.¹⁵ The fact that these uneducated people can contribute almost nothing to the good of their country is of course not their fault, but almost always the fault of governments who do not care about the basic right to education enshrined in the UN General Declaration of Human Rights from 1948.

14 UNESCO Institute for Statistics and UNICEF (2015): *Fixing the Broken Promise of Education for All: Findings from the Global Initiative on Out-of-School Children*. Montreal: UNESCO Institute for Statistics.

15 UNICEF Statistics Pakistan: http://www.unicef.org/infobycountry/pakistan_pakistan_statistics.html

What the West – and the East – understand by education

By comparison, Western educational culture almost seems to come from a different planet. For one thing, in Western Europe and North America educational opportunities are equal for girls and boys, and in almost all countries girls do better. For another, practically all children in those countries go to school. Since this has been a standard for many years now, European and North American adults have enjoyed on average 13 years of education in schools and universities. Among younger cohorts the level of education is continuing to rise. In Germany, for example, women who are now 70 have had an average of 12.8 years of school and university education, 50-year-olds have had 13.9 years and 30-year-olds, 14.8 years. A similarly high level of education is found today in the United States, although the increase in highly qualified people has levelled off in recent years.¹⁶ Thirty-seven percent of West European and 39 percent of North American men and women between the ages of 20 and 39 have completed post-secondary education, usually at a university. Thus the education level in these countries has improved steadily in recent years.

Just as attending school has come to be taken for granted, so Western societies have grown used to the idea that women can work on a par with men. Although Western women are still less likely than men to be gainfully employed, the gap is steadily narrowing. In Germany and the United States 73 percent of all women between the ages of 15 and 64 are gainfully employed – ten percentage points higher than in the year 2000. The figures for Scandinavia are higher still, with Iceland, where 84 percent of women earn their own living, holding the world record.

All these hard-working, well-educated men and women also contribute to the good of society. They are generating a previously unimaginable level of mass prosperity, evidenced by a seemingly unending rise in life expectancy. Because people are enjoying higher living standards and are therefore less at the mercy of nature and the classic risks to life and limb, because they can eat decent food and enjoy a high level of health care, and because fewer and fewer of them have to engage in backbreaking work that takes its toll on their health, life expectancy in the Western world is increasing by two to four months every year, or by about six hours every day – and has been doing so for decades.

In all areas that reflect a high level of technological development and that enable a society to generate high added value and to offer its citizens a high quality of life, Western countries together with the industrialised countries of East Asia remain in the lead. The fact that their share of the world population is shrinking has apparently

16 Lutz, W. et al. (2014): *World Population & Human Capital in the Twenty-First Century*. Oxford: Oxford University Press.

played no role as yet. The innovative power of these countries is particularly evident from the figures for registered patents according to the country of origin of those who applied for them. The statistics for 2013 show around 244,000 patents for the United States, 340,000 for Japan, 154,000 for China and 123,000 for South Korea. Germany leads in Europe with 82,000 registered patents, followed by France with 43,000, and Great Britain with 22,000. By contrast, hardly any patents have been registered from Africa and the Arab world. Nigeria, for a time Africa's largest economy with a population twice the size of Germany's, has only 44, and South Africa, the African continent's only industrialised country, has 708. Egypt, by far the most populous Arab country, contributed just 129 patents to the world's pool of ideas that year. The terrorism-plagued states of Iraq, Syria and Libya no longer appear in the databank of the World Intellectual Property Organization.¹⁷ They have been left behind in global progress towards a knowledge society.

As the patent statistics show, it is no longer correct to perceive "Western educational culture" as the exclusive preserve of the Western Europeans and North Americans. Driven by an unshakeable belief in the importance of education, the countries of East Asia – initially Japan, later the Asian tigers from South Korea to Singapore, and finally the billion-strong Chinese – launched an enormous campaign to catch up. A few decades ago some of these countries were in a worse position economically or socially than certain states in Africa or the Middle East. They analysed this deficit and drew their conclusions. Taking Western education as a model, they combined it with elements of Confucianist organisation and developed at breathtaking speed. Most of the countries of Latin America have also followed a similar route to break the cycle of poverty and underdevelopment. "Western" educational culture has thus become a "normative project" that has nothing to do with geographical or cultural categories.¹⁸ For these reasons alone the idea of a Holy War against "Western" supremacy is absurd.

In the clash of cultures of education, the successful countries are mainly concerned with maintaining or improving their positions. This sometimes ruthless technological and economic competition has for the most part replaced the wars of the past, which certainly seems like progress for civilisation. The successful countries know that they have become rich and powerful through education. They are committed to an enlightened, rational, science-based educational culture based on verifiable results. Only a scientific tradition capable of critical self-analysis will generate life-improving inventions and technologies – be they vaccines and drugs,

17 World Intellectual Property Organisation: www.ipstats.wipo.int. Since the same patent can be registered simultaneously in more than one country, the figures include some patents that have been counted more than once.

18 Winkler, H.A. (2014): *Geschichte des Westens*, Band 3. Die Zeit der Gegenwart, München: C.H. Beck.

microchips and solar parks, high-speed trains, robots or smartphones. In addition, the majority of people in successful countries realise the importance of a science-based educational culture and therefore do not question its value. All of this is diametrically opposed to the ideology of IS, Boko Haram and similar groups.

The Middle East, West Asia and Africa – educationally backward and ever more radical

As things currently stand, the Middle East, West Asia and Africa are lagging hopelessly behind in developing a science-based educational culture. After all, this is where the 25 percent of the world's adult population who have no or only incomplete primary school education mainly live. By contrast, the 40 percent of the world's adult population who have attained a level of education equivalent to a high-school diploma live mainly in Europe, North and Latin America, or East and South-east Asia.

Those societies that have so far either not managed or refused outright to adopt a science-based education culture feel pushed aside and are in many cases trying to derive a feeling of superiority on the basis of their backwardness. They interpret everything in the “West” that has resulted from education and economic success as a weakness: the ideas of the Enlightenment, the separation of church and state, the division of powers, secularisation, the ability to be self-critical, the declining significance of religion, gender equality, the acceptance of same-sex partnerships – and ultimately the declining, sub-replacement birth rates that have become the norm in almost all industrialised countries.

On this last point, Africa, Western Asia and the Middle East indeed outnumber the West. There the number of children per woman ranges between three times as high (Africa) and almost twice as high (Middle East and West Asia) as in Europe. The losers in education thus base their defiance of the West on the idea that in the clash of cultures they can win in demographic if not in economic terms. Political leaders like Ugandan President Yoweri Museveni, in whose country the population is growing faster than almost anywhere else in the world, have always emphasised that they see their demographic growth as an economic and political advantage.

The power to procreate is no substitute for education

Believing that the power to procreate is stronger than the power of education is probably a big mistake and certainly poses a great danger – more so for those countries whose populations are growing rapidly and less so for the rest of the world, for there is a risk that the former will never catch up with the latter in their development. In many places so many children are being born that even governments with good

intentions are unable to build the requisite number of schools and train teachers fast enough. Uneducated women are, moreover, a guarantee that the birth rate will remain high, so that poorly educated societies will inevitably grow more rapidly than better educated ones.

If we assume that lack of interest, conflicts, terror or a victory for the opponents of education will mean that no new schools can be built, the number of adults with less than six years of schooling would grow from around 2 billion today to 3 billion by 2060 and to more than 4 billion by the end of the century.¹⁹ Africa would then become *the* continent of the poorly educated, with the number of people with less than six years of schooling quadrupling from the current 450 million to 1.8 billion by 2100. Better-qualified adults would then become a small minority.

We can assume that the problems of the affected countries would grow more acute under these conditions. A sustained educational deficit would, moreover, have dramatic humanitarian consequences. For example, inadequate education for mothers translates directly into a higher rate of infant mortality. Assuming that the level of education stagnates, in 50 years time around three times as many children under the age of 5 would die in, say, Ethiopia, than if education were to expand rapidly over the same period.²⁰

High population growth and a lack of economic prospects means that conflicts and hunger are likely to increase in these regions of the world. But the resulting deaths will in no way compensate for the increase in the number of people. On the contrary: it is precisely poor development conditions that lead to high population growth in poor countries. As a kind of biological reflex people then have many children in the hope that at least some of them will survive, find a way of earning their living and support their aged parents. What is more, under such conditions discrimination against women and very poor educational opportunities are the rule – both factors that favour particularly high birth rates.

Under these conditions the higher, most pessimistic variant of the UN population scenarios might become true, according to which the population of Africa would grow from 1.1 billion today to around 6 billion by the year 2100; that of South Asia (including Pakistan) from 1.8 to 3.5 billion; and that of West Asia (with the Middle East) from 255 to 610 million.²¹ A total of 10 billion people would then live

19 Lutz, W. et al. (ed.) (2014): *World Population & Human Capital in the Twenty-First Century*. Oxford: Oxford University Press.

20 Lutz, W. et al. (ed.) (2014): *World Population & Human Capital in the Twenty-First Century*. Oxford: Oxford University Press.

21 United Nations Population Division (2012): *World Population Prospect, the 2012 Revision, high variant*. New York: United Nations.

in these three regions alone, more than 70 percent of the world's total population and considerably more than inhabit the entire planet today. That would be bad news indeed in the event of the anti-education culture being promulgated via the terrorism of organisations such as IS continuing to expand. Under this scenario the inhabitants of Nigeria alone, currently the main conflict zone of Boko Haram, would grow from 190 million at present to around 1.3 billion by the end of the century. Pakistan, the home of Malala Yousafzai, would have to face up to providing for around 550 million people by 2100, although it already has enough problems enough supporting only 200 million today.

All of this may happen, but it doesn't necessarily have to. How the world develops, what path societies take, and where and how many people live in peace and prosperity depends crucially on whether the revolution in education that has brought immense progress to a large part of humanity will succeed in spreading to other continents. This is a revolution that began half a millennium ago at the heart of Europe. It once formed the basis for the dominance of the West, later helping other regions of the world to develop, and it is still going on today. Interestingly enough, although this revolution was originally driven purely by religion, that particular factor has paled into insignificance over time.



2

AN INADVERTENT PIONEER OF MODERNITY

How Martin Luther brought education
to the people

The clash of education cultures raises the question of how opposing views about the value of modern education arose, why some cultures have benefited more from education than others, and what conditions are required for a culture that values education to evolve.

What is certain is that knowledge and education – in other words, individuals' ability to apply acquired knowledge and skills for the good of others and for their own personal development – have always formed the basis for the success of entire cultures. In the course of history three important things happened that greatly accelerated knowledge acquisition and the progress it generated. The first was the evolution of abstract thought. The second was the invention of writing and numbers as a means of conserving knowledge, which in turn opened up whole new dimensions for abstract thinking. And the third was the extension of education, half a millennium ago, from an elite minority to broad sections of the population, laying the foundations for the modern knowledge society. The central figure responsible for this process was Martin Luther, an Augustinian monk from the county of Mansfeld in what is now the German federal state of Thuringia.

When in 2017 – the 500th anniversary of the Reformation – we once again turn our attention to Martin Luther, we will encounter a figure with many different faces: a theology professor, a translator of the Bible, a songwriter, a publicist, a self-proclaimed prophet of the Germans and a schismatic, an anti-Semite, an enemy of the Turks and a burner of books. Yet viewed with hindsight, it is Luther's role as a great education reformer that seems most important. For Luther was the first person in history to campaign consistently and rigorously for ordinary people to be taught to read and write, a campaign that, as we now know, was to be a lasting success. It was thanks to Luther that people gained access to the world of knowledge, previously the prerogative of a tiny elite.

Until he famously nailed his 95 theses to the church door in Wittenberg in 1517, Luther had published almost all his writings in Latin. Afterwards, however, he began to write in a German vernacular that ordinary women and men would understand, using a direct, often coarse style. Luther was literally “vulgar” in the sense that he addressed the people (*vulgus* in Latin). While the intellectual elites found this alarming, it gained him a mass following.

To spread the word, Luther made extensive use of the new media of his time, printing his tracts and pamphlets in the form of leaflets, posters and broadsheets. Thanks to the printing press and the post coach system, these could be sent from Wittenberg to anywhere in the German Empire within a matter of days. No wonder Luther praised book printing as “God's highest and greatest gift of grace”.¹

Johannes Gutenberg (1400-1486) had invented the technology for reproducing written works mechanically using movable type half a century before Luther, in Mainz. During Gutenberg's lifetime, printing presses were established in five cities along the Rhine: Mainz, Eltville, Cologne, Strasbourg and Basel. The most frequently printed work was the Bible, usually in Latin.² Nevertheless, only 180 copies of the two-volume Gutenberg Bible were printed, 30 of them on high-quality parchment, which required the skins of at least 6,000 calves to produce. The typesetters needed an entire day to arrange the letters made of a metal alloy for a single page of the Bible, meaning that it took around three years for the Gutenberg Bibles to be produced.

Printed books thus remained rare objects to which only scholars and clerics had access. It was not until Luther began to have his pamphlets printed in record print-runs that book printing expanded beyond a technological niche and the printed word became a mass medium. When Luther later translated the Bible into a broadly comprehensible East Central German, the Holy Book was reproduced in much

1 Dilba, E. (2008): *Typographielexikon*. Norderstedt: Books on Demand.

2 Kästner, I. (1978): *Ausbreitung des Buchdrucks und historische Bedeutung der Erfindung Gutenbergs*. Wiesbaden: Springer.

larger print runs than ever before. The production of the Lutheran Bible claimed around a third of the entire printing capacity then available in the German states. Luther's translation of the Bible became the first bestseller in world history. By the time he died in 1546, the Lutheran Bible had been printed in numerous editions each with a print run of several hundred thousand. Reading material could now be made available to all, permitting the democratisation of knowledge.

The Late Middle Ages in the German states – an age of darkness

For the vast majority of people in the German states the early decades of the 16th century, when the late Middle Ages were waning but the modern era had not yet begun, were an era of darkness and fear, as yet untouched by the open-minded spirit of Portugal and Castile, where two explorers had set out with their barely seaworthy caravels to discover the New World. One of them, Vasco da Gama, sailed down the west coast of Africa, around the Cape of Good Hope and through what later became known as the Indian Ocean to India; the other, Christopher Columbus, was carried across the Atlantic to America by the trade winds. Both were seeking to break the Arab monopoly on the trade in spices and other valuable commodities from the Orient. Likewise, the Renaissance and humanist movements that had brought about a flourishing of the arts and sciences in mid-15th-century Florence, Milan and the Netherlands and introduced the concept of a new, self-determined human being, remained almost unheard of in the German principalities and dukedoms.

In these territories the average life expectancy was only half or one-third of what it is today. Death was a constant companion. At least a quarter of children died in their first year of life and another quarter did not survive until adulthood, their lives claimed by diseases such as the plague, diphtheria, German measles, measles or smallpox. Women's lives were on average several years shorter than men's, since the probability of dying during pregnancy or childbirth was at least 10 percent.³ The rural population in particular was plagued by hunger and epidemics, but also by the taxes imposed on them and unpaid labour they were forced to perform to the princes. Nowadays, even in the world's poorest countries, people have better lives than most Germans could expect back then.

The only hope people had was that death would release them from their miserable lives, and even then, earthly sinners faced the dubious prospect of the temporary suffering in purgatory or the eternal torments of hell. The only half-way certain chance of achieving a tolerable life after death was to be as pious as possible. The quest for salvation, for absolution by a merciful God who could save souls from

3 Schofield, R. (1986): Did Mothers Really Die? Three Centuries of Maternal Mortality in the 'World We Have Lost.' In: *The World we have Gained: Histories of Population and Social Structure*, Bonfield L. et al. (ed.), Oxford: Basil Blackwell.

hell was a central idea in late medieval thought – even for Martin Luther. He was constantly imposing new penances on himself; restless and in despair he would confess to the point of exhaustion. When he travelled to Rome on business for his order after concluding his study of theology in Wittenberg in the electorate of Saxony, he climbed the holy staircase, the Scala Sancta, of the Lateran three times, repeating the Lord's Prayer on each of the 28 marble steps, in the hope of obtaining absolution for himself and his dead relatives.

Keeping people in this state of fear was certainly in the interests of the Church authorities, for believers' religious delusions translated directly into the cash required to finance the extravagant lifestyle and magnificent buildings of the Renaissance popes and to pay off the bishops' debts. The Church had come up with the idea of selling "letters of indulgence", a kind of insurance policy guaranteeing protection against purgatory for sinners or their dead relatives. The letters were pre-printed, requiring only that the sinner's name be entered in the requisite box.

Having found no mention anywhere in the Bible that letters of indulgence would have the slightest effect, Martin Luther became incensed by this unholy practice. In protest he wrote his famous theses and, according to legend, nailed them to the door of the Castle Church in Wittenberg on 31 October 1517. It was not the practice of absolution in itself that angered Luther, but the Church's presumption that it could administer the "treasury of grace" in God's name, selling and distributing indulgences as it saw fit so that people could simply go on sinning as they pleased.

It was during this time that Luther began to reflect on a doctrine of justification. After struggling for many years with the Apostle Paul's Epistle to the Romans about a righteous God, Luther reached the conclusion sometime between 1511 and 1517 that the way to salvation lay in a personal relationship with God by faith alone (*sola fide*) – and not via the monopoly of the Church, which granted redemption through its trade in penances and indulgences. In Luther's view, believers could form a relationship with God only by reading the Holy Scriptures (*sola scriptura*) personally and with an independent mind. The idea that people could practise their faith independently of any interpretation laid down by a patronising Church became the spiritual foundation of the Reformation. Luther believed that in their relationship with God human beings were responsible only to the Holy Scriptures and their own conscience. Some historians and religious scholars see in this declaration of emancipation a basis for the much later formulation of human rights and the emergence of democracies.

From then on Luther strove to communicate this insight to all Christians. He told them that precisely because humans were sinners, their hope of eternal life lay solely in their belief in Jesus Christ and in God's grace (*sola gratia*). The works they performed on earth and the hateful money they paid for indulgences were irrelevant.

This was the unprecedented, revolutionary and – for the Catholic Church of the time – intolerable aspect of Luther’s message: salvation can be had for free!

How the Bible became the first bestseller

Although the original version of the 95 theses on indulgence was still written in Latin, the Nuremberg patrician Kaspar Nützel, a great admirer of Luther, translated them into German only a few weeks later. The theses were printed as posters, packed in casks and sent all over the realm of Emperor Charles V, where they sold like hot cakes. This was big business for the printers, for the dearth of printed works meant that anyone who could read and write devoured anything they could lay their hands on, especially if it had been sent by Martin Luther, who already had a nationwide reputation as a rebel.

How the quarrel between Luther and the Church authorities ended is well known: Rome issued a bull of excommunication accusing him of a total of 41 false doctrines, declared him a heretic and demanded that he retract his theses within 60 days. In response, Luther publically burned his copy of the bull and declared the Pope an anti-Christ in league with the devil. And he called for a radical rejection of all the fuss around the seven sacraments, of which he could only accept the three authenticated in the New Testament, namely communion, baptism and penance. Some of his pamphlets had already reached print runs of more than a hundred thousand, despite costing the equivalent of an hour’s wages of a tradesman.⁴

At the Diet of Worms on 17 April 1521 – standing directly opposite the 21-year-old Emperor Charles V – Luther refused once again to retract his doctrine. He was excluded from the Church in the Edict of Worms and hence declared de facto an outlaw. Luther’s influential patron Frederick III, Elector of Saxony, thought it wise for the Reformer to go into hiding and had him taken secretly to the Wartburg Castle near Eisenach.

Luther used the time in the Wartburg, where he lived incognito as “Squire Jörg”, to translate the New Testament from Greek into German in only eleven weeks. Written in direct, simple and understandable language, it became the Germans’ first “primer”, thus incidentally creating the foundation for German as a written language. The Lutheran Bible was much easier to understand than the editions of the Bible translated word for word from the Latin into Upper or Lower German. The first edition of 3,000 copies published in Wittenberg in September 1522 sold out within three months. At a price of one and half gilders, it cost as much as a horse or a month’s salary for a tradesman.

4 Schilling, H. (2012): *Martin Luther. Rebell in einer Zeit des Umbruchs: Eine Biographie*. München: C.H. Beck, p. 241.

The education revolution

The ideas of the Reformation had by this time begun to gain in popularity far and wide. Yet how was Luther actually to achieve his goal of enabling every individual to find salvation through a personal reading of the Holy Scriptures? Those who could read the Lutheran Bible were still a very small minority – around 1 percent of the population. Only the aristocracy, the clergy and some sectors of the bourgeoisie in the towns were literate, almost all of them men. For the broad masses and also for many rulers education was considered a waste of time. So anyone who really wanted to disseminate the Bible among the people would first have to educate them.

Luther saw the ignorance of the people and the Church's hostility to education as the ugly face of the devil, who sought to retain control over divine truth. He preached that it was God's command to enable children to read the Holy Scriptures by giving them education. He repeatedly called on parents to send their children to school, saying it was unchristian to abandon them to the devil. Here he expressly included girls as well as boys: "And if only every city had a girls' school in which every day the little girls would listen to the Gospels for an hour."

In spring 1524 Luther wrote his pamphlet "To the Councilmen of all cities in the German states, that they should establish and maintain Christian schools."⁵ In it he called for children to be taught more than was necessary for earning their daily bread. No secular ruler had ever launched such a broad education initiative.⁶ But for the Reformer this was only a means to an end. He was not concerned with using mass education to open the way towards secular self-actualisation and the liberation of the people, but rather with enabling them to gain personal access to God through the Holy Scriptures.

The person responsible for driving Luther's education reform in practice was Luther's long-term fellow-traveller and most important colleague, Philipp Melancthon, himself the product of an unusual education career. As a highly gifted boy he had begun studying ancient languages at the University of Heidelberg at the age of 12. By the age of 16 he had obtained a master's degree and was lecturing in his own right. In Tübingen he then studied the full range of disciplines offered at the time – mathematics, music and astronomy – pursuing advanced studies in Greek, Latin and Hebrew on the side. At the age of 21 he became a professor at the newly founded university in Wittenberg, where he met Martin Luther.

5 Aland, K. (Hg.) (1990): *Luther Deutsch. Band 5, Die Schriftauslegung*. Göttingen: Vandenhoeck & Ruprecht, p. 70.

6 Schilling, H. (2012): *Martin Luther. Rebell in einer Zeit des Umbruchs: eine Biographie*. München: C.H. Beck, p. 435.

Luther and Melanchthon were polar opposites in character, and thus complemented each other perfectly. While Luther was impulsive, ambitious and blustering, the humanist Melanchthon was introverted and sensitive. They were like “the smith and the precision mechanic of the Reformation”, as Luther’s biographer Heinz Schilling wrote. Melanchthon founded the “higher schools”, those institutions of general education that later became grammar schools in Protestant Germany. These schools initially became widespread in the Duchy of Saxony and served primarily to educate the clergy in Christian doctrine and to realise Church reform. The purpose of these schools, according to Melanchthon, was to train ministers for the Church and officials for the state. As rector of the University of Wittenberg, he decreed new study regulations, which alongside religion, law, medicine and philosophy also added physics and mathematics to the curriculum. Melanchthon’s educational ideal was a religious humanistic one, his teaching methods surprisingly modern. Instead of dictation and learning by rote, he encouraged his pupils to engage in question-and-answer games in order to get them to participate in the lesson and to sharpen their critical faculties.

Supported by the Duke of Mansfeld, Melanchthon in 1524 established the “trivial school”, which had three levels: in the first children learned to read and write; in the second they were taught grammar and learned to write speeches and letters; and in the third they were prepared for university. Melanchthon saw general education as the basis for specialised studies later on.⁷ He generally regarded it as the obligation of the cities, not the churches, to establish and finance schools. Like Luther, Melanchthon instructed parents to obey God’s command and send their children to school: “Anyone who does not make the effort to see that his children are correctly taught is not only godless, but despite his human appearance has the mind of an animal.”

Following the Reformation, Luther and Melanchthon became convinced that monasteries no longer had any point, since they found nothing in the Bible to suggest that they were any more necessary than celibacy was for priests. They therefore called for monasteries to be converted into schools, the monasteries into boys’ schools and the convents into girls’ schools. And the latter were to teach girls not only from “noble families”, but from all classes of society.⁸ Hence the Reformers were the first to advocate gender equality in education.

However, public education policies were not uncontroversial even in Luther’s time. Although most of the earliest schools for boys and girls were established by

7 Scheible, H. (2010): *Aufsätze zu Melanchthon*. Tübingen: Mohr Siebeck.

8 Jesse, H. (2005): *Leben und Wirken des Phillip Melanchthon: Dr. Martin Luthers theologischer Weggefährte*. München: Herbert Utz, p. 139 ff.

Protestant cities and principalities, it was not the municipal administrators, but a coalition of Lutheran pastors and citizens who advocated the necessity of elementary education for all.⁹ The most progressive rulers were those in the west of the Holy Roman Empire, in the area under the influence of the Protestant city of Strasbourg. In 1592 Duke John I of Pfalz-Zweibrücken became the first person in the world to introduce compulsory schooling for girls and boys.¹⁰ Gradually the idea that all children should go to school became generally accepted, but this certainly did not mean that all children were actually able to go to school. For the rural population who needed their children as labour, school was an unnecessary annoyance. Some municipalities were unable to realise their ambitions for lack of money, trained teachers or school buildings.

Yet was the gradual but inevitable spread of education and all that followed in its wake really the sole doing of Martin Luther? Was he a historical innovator who flung open the door to the modern era, prepared the way for the Enlightenment and paved the way for human rights and democracy? Was he an idealist who strove to set the world to rights, as he is portrayed by so many scholars of religion and education, historians and philosophers?

If Luther was all or any these things, he was so inadvertently at best. As a man of the Middle Ages, he could hardly have had an inkling of how the developments he had initiated would unfold in the modern age. None of his writings suggest that he could have foreseen the true consequences of the Reformation, in particular those that went beyond religion. If he had, he would probably have been shocked, for his goal was emancipation in a spiritual, religious sense – never in a secular one. But the new freedom of thought that Luther preached meant the tide could no longer be turned. The seeds of what was to follow were already evident during Luther's lifetime in the peasants' revolts, which he resolutely rejected as a threat to the existing social order. Luther would have seen many of the processes ushered in by popular education and emancipation – pluralism, secularisation and individualisation – as the work of the devil, for ultimately personal emancipation reached a point where people no longer depended on religion as a source of comfort; Luther would have been dismayed by what he had set in motion.

Yet the Reformation released the genie from the bottle. The spiritual monopoly of the Roman Church in Europe had been broken once and for all. Access to education, in principle at least, had been democratised. Rational thought increasingly pervaded

9 Schilling, H. (2012): *Martin Luther. Rebell in einer Zeit des Umbruchs: Eine Biographie*. München: C.H. Beck, p. 443.

10 Sehling, E. (2009): *Die Evangelischen Kirchenordnungen des XVI. Jahrhunderts*, Band 17, Teil 2. Tübingen: Mohr Siebeck.

the sciences. In 1652 the Academy of Naturalists, the *Academia Naturae Curiosorum*, later known as the Leopoldina, the world's oldest academy of sciences, was founded in the Lower Franconian city of Schweinfurt, which had become Protestant 110 years earlier. Scientific discoveries provided ever more explanations for things that had previously been thought to be the will of God, giving rise to a new view of the world. This created fertile ground for the Age of Enlightenment, on the basis of which the Industrial Revolution was later to unfold.

Many other people contributed to the social, scientific and political changes that have taken place over the centuries since the Reformation. But without Martin Luther, these changes would certainly have taken a different path. The crucial innovations of the centuries that followed came from Europe. Luther's education revolution had changed the world.

From imitation to conscious learning – the evolution of the abstract

This is certainly not to say that in the time *before* Martin Luther there was no education, no scientific or social renewal. For several millennia human beings had left behind great works, had trained philosophers, artists, historians, architects and astronomers, and had recorded knowledge in writing and passed it on to subsequent generations. Conscious learning and understanding are by no means inventions of the modern age; they are a basic skill of *Homo sapiens* and one that distinguishes our species from all others.

The brain of this anatomically “modern” man, who evolved from his East African ancestors around 200,000 years ago, was almost identical in structure to the present-day human brain. He had language, he was able to use fire and he made tools out of stone and bone. Probably at all stages of his evolution he taught his children and adolescents the skills they required – he “educated” them to survive.

Studies of the last hunter-gatherer peoples who still live on the savannah or in the rain-forest regions have revealed that they consciously pass on complex skills such as reading animal tracks or making tools to other members of their tribe and to their children. Even before they become adults, children learn where food can be found and how to protect themselves against the hostile elements. By contrast, animals learn from one another only by imitation: young chimpanzees, for instance, watch older ones until they can imitate their behaviour, but they are not instructed in how to do so. Human beings are the only animals that teach.

Teaching children requires a certain capacity for abstract thought. For example, anthropologists have reconstructed how a million years ago *Homo habilis*, the predecessor of *Homo sapiens*, produced hand axes strong enough to slit open the skin of an elephant. This involved taking two pieces of rough stone and, in a process

involving six or seven steps and a variety of techniques, using one stone to work the other so as to produce the required result. The craftsman had to know, for example, that if the fourth step was performed before the third the stone would be smashed to useless fragments. He always needed to have the end product in mind – rather like a good chess player who can think several moves in advance. Technology of this kind, the anthropologists concluded, could not be passed on by simple imitation but required not only a conscious act of teaching, but also the conviction that teaching is a useful activity.¹¹

The ability to abstract – in other words, to describe things, processes and connections while concentrating on the essentials and ignoring details not necessary for understanding the process as a whole; the ability to think about concepts and models and imagine something that does not yet exist – these were skills that were comparatively undeveloped among our early ancestors. Abstraction probably did not develop further until after written symbols – i.e. the earliest forms of numbers and an alphabet – had been introduced to conserve knowledge. Apparently the brain requires a structure based on learning symbols in order to progress from simple observation to an abstract interpretation of events.

Indeed, modern brain research has shown that every new experience, every learning process creates new synapses or connections between nerve cells and hence new, permanent structures in our brains. This is what enables us to always perceive new experiences on the basis of what we have already learnt – in other words, differently than in the past. Every learning process thus not only alters our consciousness but also the physical make-up of the brain. Learning turns us into different people. What neurological researchers have yet to show is when and under what conditions the transition takes place from object-based thought to abstract thought.

Psychologists have developed a number of tests that provide at least a partial answer to this question. One of them is the so-called noun definition test, which is much simpler than it sounds. Test subjects are asked to define objects of everyday use, for example, a knife. A modern person who has been to school, can read and write and has acquired a certain level of education will usually answer with an abstract definition, such as “A knife is an instrument for cutting.” But when the same question is addressed to people who have never been to school, they often don’t know what to say, or don’t even understand the question. They know what a knife is, of course, because they use it in their daily lives. But they take it so much for granted that they

11 Stout, D. (2011): Stone toolmaking and the evolution of human culture and cognition. *Philosophical Transactions of the Royal Society*, Series B, 366 (1567): 1050-1059.

are unable to think about it abstractly and are thus likely to say something like “A knife is a knife.” This indicates that the ability to abstract is connected with literacy.¹²

The transition from object-based to abstract thinking takes place in several stages between babyhood and adolescence. The first person to advance this theory was the Swiss developmental psychologist Jean Piaget (1896-1980), who published it in his fundamental work *The Growth of Logical Thinking from Childhood to Adolescence* in 1958. Piaget believed that child development took place in four different stages, each of which had to be completed before the next one could begin. No stage could be left out.¹³

In the first stage the child learns literally to “grasp” the world. It dips its hands in water or uses them to feel a wooden building block, thus learning that different things have different properties. This stage is completed in roughly the first two years of life. It is known as the sensory-motor stage because the child makes discoveries through touch and movement.

The next stage, called the pre-operational stage, when children learn to speak, lasts until the child is about 7; in early developers it is shorter. During this phase children learn, for example, that objects that disappear from their field of vision are still there. In this phase children are still egocentric: they relate the entire world to themselves and cannot imagine that other people might see it differently. Objects still have a life of their own: for example, when a child of this age kicks a football and misses the goal it is because the football has decided of its own volition to fly over the top of the goal. Children of this age are not yet in a position to understand causal relationships, in this case the fact that the ball missed the goal because the child’s foot was wrongly positioned while shooting.

This understanding does not occur until the third stage, that of concrete operations. By around the age of 11 children have learned to draw conclusions (a plant will only grow if it is watered), to classify (spruces, oaks and beeches are trees, but lions, horses and penguins are animals) and to grasp the first forms of abstraction. This includes being able to handle symbols, such as the alphabet. In this developmental phase, children learn to form words and sentences out of letters and distinguish between speaking and reading.

In the final, formal operations stage children and adolescents learn to think not only about concrete things, but also about ideas and models. They can imagine

12 LeVine, R.A., LeVine, S., Schnell-Anzola, B., Rowe, M. L., and Dexter, E. (2012): *Literacy and Mothering. How Women’s Schooling Changes the Lives of the World’s Children*. Oxford: Oxford University Press.

13 Piaget, J., and Inhelder, B. (1993): *Die Psychologie des Kindes*. München: Deutscher Taschenbuch Verlag.

things that are not visible, for example, the structure of an atom, and learn to use mathematical and physical equations to explain connections. Not all human beings reach this stage. For this advanced degree of abstraction, they require a basic level of education.

Nowadays Piaget's stages are to some extent regarded as outdated, since intellectual maturity is not attained in a fashion so rigidly defined. Piaget also underestimated children's abilities and the effect of the living environment on cognitive development. We now know that some children may pass through the various stages more quickly and that the ages at which the various developmental phases take place are not as fixed as Piaget postulated. Nevertheless, it is regarded as proven that children are only capable of certain cognitive achievements after they reach a certain age. These achievements stem from a combination of innate ability and interaction with the world, in other words, the stimuli to which the young brain is exposed. Here literacy plays a key role. Only if the children learn to read, write and do arithmetic can they have the wherewithal to engage in higher abstract thinking.

This also applies to hunter-gatherer cultures that did not have written symbols and were therefore probably incapable of reaching the formal operations stage of thinking. This does not mean they were less gifted or "dumber" than the classical civilisations and industrialised societies. They simply used their brains, which are anatomically basically the same as ours, for other skills – skills that modern people have lost. Without written symbols to conserve and accumulate knowledge, they simply had fewer opportunities to benefit from abstract thinking and to make bigger developmental leaps. They did not have "education" as it is defined today, but instead a large reservoir of knowledge based on experience that they passed on to one another and to their children. And they had another advantage: they were egalitarian. The concept of social classes was unknown to them, and tasks were distributed equally between men and women. This too changed with the invention of writing. For the advent of education meant that there were suddenly educated and uneducated people.

In the beginning was writing – how numbers and letters changed the world

The first writing cultures probably originated in Mesopotamia – the area between the Tigris and the Euphrates rivers – and in Egypt 5,000 years ago. Initially writing was used primarily to keep simple accounts: how many sacks of grain were there in the granary? How many had been delivered when and by whom? How long would the stocks last? The oldest written symbols concerning grain deliveries have been found incised into bones in Egypt. Writing was primarily used to record and establish legal certainty about things that could easily have been forgotten or changed during oral transmission.

The first written symbols were pictograms – simple, standardised representations of fish, storage containers, arrows and kings. Out of these figural hieroglyphics, the more abstract cuneiform script developed. The script used symbols for syllables or whole words, for example, an X to denote a sheep. The symbols were inscribed into wet clay tablets and were used to record laws, medical texts, lines of succession, prayers, purchase contracts or epics. Messengers could transport secret instructions and news over long distances, initially on these tablets, later on rolls of parchment or papyrus.

The first number systems are roughly as old as the first writing. The ancient Egyptians already used the decimal system not only to count, but also for all four forms of basic arithmetic. The Egyptians also had advanced geometry, without which they would have been unable to build the pyramids or to measure the fields of the farmers along the Nile. This had to be done every year after the floods had washed away the old boundary markings.

In early advanced civilisations such as ancient Egypt, scribes trained in special schools became a highly respected and elite guild who, as written culture became more important, in some ways had more influence than their often illiterate rulers. Only with written documentation could a country be governed, taxes collected, armies controlled and large, complex societies organised. In the course of the centuries, writing pervaded all areas of state administration and religion.

Nevertheless, only a very small circle was privy to the secret of written symbols in ancient Egypt. Even at the peak of Egyptian civilisation, during the period of the “Old Kingdom” between 2700 and 2200 BC, when the three great pyramids were built at Giza, only perhaps 1 or 2 percent of the population could read and write. The vast majority of the population were either peasants, who did not need education to grow grain, or slaves who were used to move blocks of stone weighing several tons and were therefore not required to think any more than were Nubian or Libyan mercenary soldiers. The small elite of scribes, architects, artists, administrators and priests was sufficient to perform the great tasks at hand: organising the administration, controlling and planning the state and the army, and producing material and immaterial cultural goods that have survived to this day. We need only call to mind the great temples at Luxor or Karnak, the jewellery and art works made out of stone, glass, metal or ceramics, and the discoveries in the fields of astronomy, medicine and mathematics.

Confucian educational ideals

Egypt was not, however, the only region of the world where writing spurred the development of an entire culture. The oldest Chinese symbols have been found

inscribed on bones dating from the Shang Dynasty (roughly 1600-1050 BC). Like the Egyptian symbols, they are pictograms and are regarded as precursors of Chinese characters, some of which remained figural, while others were replaced over time with abstract symbols.

Of the roughly 87,000 characters documented in the largest Chinese dictionaries, many have lost their practical significance. Nevertheless, for everyday purposes, Chinese still need to know between 3,000 and 5,000 characters. This makes Chinese writing relatively complicated and particularly challenging to learn.

By the era of the philosopher Confucius (551-479 BC) education in China had acquired a high status and mastery of classical literature was considered the chief educational goal. Only those who succeeded in passing a series of demanding and centrally organised examinations had a chance of entering the civil service and making a career there. The education system was geared heavily towards achievement and followed the Confucian doctrine of social equality in school. The principle was one of equal opportunity, although in ancient China this excluded women as well as peasants, who made up the vast majority of the population.¹⁴ In practice, however, only members of the upper classes were in a position to put in the requisite preparation for the examinations. After a preliminary examination, candidates were required to take the three-stage centrally administered state examinations held simultaneously throughout the country every three years. The first examination took a whole day, the second, three days, and the final, highest examination, which qualified successful candidates for the civil service, took thirteen days.¹⁵

The traditional Chinese examination system remained in place until the early 20th century. Examination statistics from the year 1903 give us an idea of how tough the selection process was: of 760,000 candidates admitted to take the first examination after passing the preliminary one, only 28,923 passed, less than 4 percent. In the second examination (which could be attempted more than once), only 1,586 of 190,300 candidates were successful, considerably less than 1 percent.¹⁶ No statistics of this kind exist for the third examination. The few people who managed to get through the examination marathon successfully were then appointed to high government office. Candidates were examined on their knowledge of important literary works and their interpretation by famous scholars. Science, on the other hand, had no role to play and could be studied only at private schools, which of course limited the number of people acquiring a scientific education.

14 China Education Center Ltd.: History of Education in China: Confucianism, <http://www.chinaeducenter.com/en/chistory.php>

15 Monroe, P. (1907): *A Brief Course in the History of Education*. New York: Macmillan.

16 Monroe, P. (1907): *A Brief Course in the History of Education*. New York: Macmillan.

These education elites formed the basis of the Chinese civil service and sciences, in which the Chinese were well ahead of the West in practically all fields until well into the 15th century. Paper, printing, gunpowder, clocks, porcelain, paper money, the compass and the abacus are all Chinese inventions. Without the experience of hydraulic engineers with their sophisticated irrigation systems consisting of canals, pumps and water pipes for the cultivation of rice, it would not have been possible to feed a population that already exceeded one hundred million in 1100.¹⁷

In other parts of the world, too, only a fraction of the population was able to enjoy an education. In India the caste system excluded the participation of those at the bottom of the social ladder, and even in the higher castes only a small percentage could read and write. This situation continued into the 19th century, as the oldest statistical data of the British colonial administration show: according to these, in 1853 only 0.014 percent of boys and girls of school age attended school.¹⁸ The state-controlled education system established by the Aztecs in Central America likewise reached only a minority. Until the age of 14 boys from noble families were educated by their fathers under the supervision of the administration. After that, they either received military training or learned writing, astronomy and administration in temple schools. The sons of farmers, tradesmen, merchants and slaves had no access to schools.

Ancient Athens – education and democracy

In ancient Greece two education models developed in the city states of Sparta and Athens, and they could not have been more different. The only thing they had in common was that, unlike the cultures described above, a large percentage of male citizens had access to the education system. Only a minority of the population had the status of citizens, however. Women, slaves and metics (non-citizen residents, usually from other parts of Greece) were excluded from participating in society.

In Sparta education consisted primarily of physical training for boys. At the age of 7 they entered military training camps and were practically forbidden from leaving them for the next five years. In these camps they mainly learned to tolerate extreme hunger and pain; reading and writing were secondary. Those who managed to survive the first five years then went on to a higher school, where the demands and punishments were even more brutal. In the final examination, taken at the age of 18,

17 Asia for Educators: Issues and Trends in China's Demographic History: Aspect of size, http://afe.easia.columbia.edu/special/china_1950_population.htm

18 Chaudhary, L. (2012): Caste, Colonialism and Schooling: Education in British India, Social Science Research Council, Working paper May 2012. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2087140

young Spartans were required to prove that they were able to successfully pursue and kill an adult slave. Two years and several examinations later, the men then finally qualified as Spartan soldiers.

Young female citizens also had to undergo state training until the age of 18. Here too, physical fitness and resilience were primary aims so that women could become good mothers to future soldiers. In some ways the Spartan training system was one of the most comprehensive and rigorously organised in history. Because it was geared almost entirely to waging war, it was very successful in that respect and Sparta was long considered unconquerable. Yet ultimately the city state became unproductive and impoverished; having lost too many men in battle, it fell prey to social unrest. Following its defeat by the Thebans in the Battle of Leuktra in 371 BC, the demise of Sparta was inevitable.

In the city state of Athens, which was at war with Sparta for almost three decades from 431 BC onwards in the Peloponnesian wars, education practices were much more civilised. The parents of the citizen class taught their children at home, supported by private teachers known as “pedagogues”. The curriculum included reading and writing and an introduction to morals. Parallel to this, Athenian boys learned sports and martial arts at the “gymnasium”. At the age of 15 males whose parents could afford to send them there entered secondary school, where they were taught rhetoric, geometry and natural sciences. The teachers attached particular importance to teaching the boys to develop their powers of judgement and their ability to argue in dialogues and debates.¹⁹

Although education in ancient Athens was broader than in any other previous culture, it remained the prerogative of a minority. It reached only males with the status of citizens, but neither girls and women nor slaves, and hence perhaps only 15 percent of Athenians were educated.²⁰ This was still a comparatively large proportion of the population, however, and sufficed to enable Athens to produce what is probably its greatest invention: democracy. Although this form of government had little in common with democracy as we know it today, allowing only a minority to have a say, it was still considerably more democratic than an autocracy, in which only a few individuals had any say at all, or an aristocracy ruled by cliques.

Political decisions were taken in Athens not only in the influential Council of the 500 – a precursor to the modern parliament – but also in the assembly of male citizens (once again excluding women, slaves and metics). The men of the assembly could hold a so-called ostracism to banish citizens who had become unpopular. Ostracised persons had to stay away from Athens for ten years. These were usually

19 Monroe, P. (1907): *A Brief Course in the History of Education*. New York: Macmillan.

20 Bleicken, J. (1995): *Die athenische Demokratie*. Paderborn: Schöningh.

politicians considered to be excessively power-hungry and thus a danger to democracy. At ostracisms the citizens inscribed the names of those to be banished on pieces of broken pottery (*ostraka*). Literacy and education thus not only made Athenian citizens intellectually capable of argument, discussion and practising democracy; but the ability to write was also a direct precondition for exercising democratic rights.

Ancient Rome – the decline of education and the Empire

Athens was thus much more advanced in terms of education than ancient Rome was ever to be. There the state was interested primarily in the central organisation of the military. Although almost all Roman cities had schools, these were generally privately organised educational institutions for the sons of the local upper class. They took the Athenian educational ideals as a model, and the teachers were often Greek slaves. According to estimates, the literacy rate of the entire population in the western provinces of the Roman Empire was never higher than about 5 percent.²¹ Rome's great architectural legacy – the bridges, the domes, the theatres, aqueducts and roads – were hence all derived from the knowledge and skills of a small technical elite. When they disappeared in the Migration Period, this technical knowledge disappeared with them. Once a city of a million inhabitants, by the early Middle Ages the ruins of Rome were home to only a few thousand people, most of them connected with the Papacy, and the crumbling arches of the once proud Roman Forum sheltered shepherds from the rain.

Following the decline of the Roman Empire in the west after the deposition of the last emperor, Romulus Augustulus, in 476 AD, and the invasion of Italy by the Lombards, the education level of the population of Italy fell rapidly. Only in the monastery schools, whose founding in the 6th century is attributed to Benedict of Nursia, was knowledge passed on to the next generation. Initially only novices went to these schools, but later selected laymen were admitted as well. Through the expansion of cathedral schools in the diocesan towns in the early Middle Ages, some men from the upper class gained access to education. Even a few noblewomen were able to enjoy an education in convents.

Only after the Arabs conquered the greater part of the Iberian Peninsula in the 8th century did a new education culture begin to spread in the western Mediterranean. Arab scholarship, especially astronomy, mathematics and medicine, flourished. Some evidence has been found in what is now Spain that the relatively high level of

21 Harris, W.V. (1989): *Ancient Literacy*. Cambridge: Harvard University Press.

education in the Caliphate of Córdoba formed the basis for the peaceful coexistence of Jews, Christians and Muslims.²²

Tuscany in the Middle Ages – a spiritual renaissance

Three things emerge from this survey of education in cultures predating Martin Luther's Reformation. Firstly, writing was always a precondition for the emergence of advanced civilisations. Secondly, people were aware of the purpose and necessity of education, as shown by the drilling and pressure to achieve at schools. Thirdly, education was always a privilege reserved for a small section of the population, which meant that the vast majority were unable to contribute to social development, benefit from cultural achievements and improved living conditions, or have a say in how society was run. Over time all these cultures declined in significance vis-à-vis others that were superior in terms of numbers, military strength and civilisation.

It was not until the 14th century that the educational landscape gradually began to change. In Italy, particularly in the Tuscan cities of Florence, Siena and Pisa, this was the beginning of the Renaissance, the rebirth of the spirit of classical antiquity, of humanism, and of scholarship and education modelled on antiquity. This brought about an unprecedented flourishing of the arts, architecture and science. The Renaissance gave birth to artists such as Michelangelo and Raphael, political thinkers such as Niccolò Machiavelli, patrons such as the Medici family, and universal talents such as Leonardo da Vinci.

In the cities, at least, education reached the majority of the population in the middle and upper sectors of society. Some historians claim that two thirds of the male population could read; others estimate the figure at more like 25 to 35 percent.²³ What is certain is that the economically prosperous cities attracted educated people from all over Italy and further afield. Among the rural population, probably between 3 and 10 percent of men could write their names, while most women remained completely illiterate.²⁴

As Tuscan culture continued to blossom, the education of the urban middle classes became a necessary condition for the development of complex trade and early capitalist financial systems. In view of the economic advantages that this early

22 Blindermann, A. (1969): Medieval Correspondence Education: The Responsa of the Gaonate. *History of Education Society*, 9 (4): 471-474.

23 Black, R. (2007): *Education and Society in Florentine Tuscany: Teachers, Pupils and Schools, c. 1250-1500*. Leiden: Brill.

24 Graff, H. (2005): On Literacy in the Renaissance. Overview and Reflections. In: *The Routledge Falmer Reader in History of Education*, McCulloch, G. (ed). London: Routledge, pp. 51-67.

knowledge society offered, parents and municipal administrations alike had a huge interest in investing in the education of the next generation.

As in Athens, so too in Florence better education brought a growing desire for political involvement and increasing opposition to the profligate lifestyle of the nobility and the corruption of the Church and the Pope. A particularly courageous figure in this respect was the Dominican monk Girolamo Savonarola, who could have become a kind of Italian Martin Luther, since he aired similar grievances. He found much popular support, but unlike Luther did not have a political patron like the Grand Duke of Saxony to hold a protective hand over him. Although his criticism was justified, Savonarola had no chance. After he failed to comply with Pope Alexander IV's withdrawal of his license to preach, Rome excommunicated him. In 1498 Savonarola was condemned to death, publicly hanged together with two of his associates and subsequently burned.

Nevertheless, the humanism of the Renaissance spread to many countries in Europe during the 15th and 16th centuries, bolstered after the Ottoman conquest of Constantinople in 1453 by the influx of large numbers of Greek scholars who sought refuge in Europe. This brought Renaissance intellectuals into direct contact with ancient cultures and the Greek language.

Erasmus of Rotterdam (1466-1536), the most influential humanist of the early modern era, published a commentary on the Greek edition of the New Testament on which Martin Luther's German translation of the Bible was based. Erasmus was a well-travelled man who maintained a lively correspondence with all the leading humanists in various parts of Europe. He too was a sharp critic of the state of affairs in the Church but, unlike Luther, he shied away from breaking with the Church authorities in Rome and spent much of his life campaigning for internal reform.

Education reform was one of the main concerns of the humanists, primarily reform of the universities and the so-called scholarly societies. In collaboration with the princes and other patrons, the humanists amassed large libraries. They believed that theologians, lawyers and doctors should complete a propaedeutic course of study – a kind of introduction to languages, scientific methodology and logic – before they embarked on studying their chosen discipline. All students were thus to be given a humanist general education. The humanist pedagogues espoused milder and more lenient educational methods than was customary in the Middle Ages, seeking to motivate their pupils through encouraging ambition and competition rather than through discipline and obedience. In some ways the content and methods of a humanist education resembled those of the Protestant education described above.

Humanism for the people

The key difference between humanism and the Reformation of Martin Luther was that humanist education, like its predecessors, was intended only for a small elite, whereas the goal of the Reformation was to educate the entire population. Martin Luther believed that *everyone* should learn to read, so that they could access the Holy Scriptures first-hand rather than being dependent on the Church authorities as intermediaries. This ‘vulgarisation’ of education went much too far for Erasmus of Rotterdam. He complained loudly that Luther “makes everything public and even allows the lowliest tradesman to participate in solving problems that previously were the prerogative of scholars and were guarded by the initiated like mysteries”.²⁵ Luther’s use of the vernacular was highly suspect to the elitist humanists used to communicating in Latin and Greek.

Seen with hindsight, what seemed at the time to be an insignificant side-effect of the Reformation and the confrontation with the Vatican was actually a key turning point in world history. The education movement that resulted from the Reformation was geared precisely to enabling even the “lowliest tradesman” and the mass of peasants to read. For the first time in the history of humanity, the goal was to achieve universal literacy regardless of gender or social class. Martin Luther and his fellow campaigner Philipp Melanchthon adopted the humanist approach to education, but not its elitist principles. The Reformation brought humanism to the entire people.

But it was to be some time before education attained a broad basis in practice. The turmoil of the Thirty Years War (1618-1648) led to severe setbacks for the spread of education. Together with the famines and epidemics that came in its wake, the war wiped out half the population in some regions of the Holy Roman Empire of German nations and almost completely destroyed local economies.

Under Duke John I, who had converted to the Reformed faith, the minor Dukedom of Pfalz-Zweibrücken in south-western Germany introduced general compulsory education in 1592. Strasbourg (1598), Saxony-Gotha (1642), Braunschweig-Wolfenbüttel (1647) and Württemberg (1649) – all of them Protestant regions – followed suit. In 1717 predominantly Protestant Prussia became the world’s first territorially large state to introduce compulsory schooling. Protestant Norway followed in 1739. Only in the wake of the Enlightenment did Catholic rulers – such as Maria Theresa of Austria in 1774 – also recognise the necessity of universal schooling. However, it was to take many more decades and even centuries before compulsory schooling could be realised in practice everywhere.

25 Schilling, H. (2012): *Martin Luther. Rebell in einer Zeit des Umbruchs: Eine Biographie*. München: C.H. Beck, p. 174.

Education and economic prosperity in the wake of Protestantism

What, however, were the advantages of broadly based education reforms that almost certainly consumed major financial and administrative resources? It is clear that the economic prosperity generated by literacy campaigns was not felt immediately, for it took many years for schools to become established. What is more, it takes a great many years for a child who has learned to read, write and do arithmetic to become an economically productive adult. For all their enthusiasm, the princes were thus unable to reap the fruits of their reform efforts in their lifetime. Their vision was rewarded only in the long term.

Today, half a millennium after the Reformation, it is easier to analyse the consequences of the education initiative triggered by Martin Luther. Studies of the social and economic history of the past few centuries clearly confirm that Luther's approach to education went far beyond providing access to the Holy Scriptures. It increased the knowledge, skills and hence the prosperity of broad sections of the population. The humanist elitist model gave rise to major achievements in thought and art; it did not, however, improve living conditions for the majority of the people. Economic developments in various parts of Europe until well into the 20th century unambiguously attest that all Protestant societies were more successful than Catholic ones. Northern Germany, the Netherlands, England, Scandinavia and to an increasing degree the United States gained prosperity and influence over this period, whereas the once wealthy Catholic powers like Spain and Portugal as well as the territories that later became Italy declined.

Catholic colonial powers – rich in gold and silver, poor in education

The steady decline of the great Catholic colonial powers of Spain and Portugal may be explained in terms of their adherence to old, elitist educational structures. At the height of its power the Spanish colonial empire under King Philipp II was one of the greatest in the history of humanity. Following the principle of “discover, conquer, convert and exploit”, the seafarers sent by the Spanish crown had appropriated large parts of America and Asia with the goal of finding the mythical land of gold, El Dorado. Yet the huge quantities of gold and silver that Philipp II confiscated and mined in the colonies were unable to prevent the Spanish state from going bankrupt three times, for at home Spain was not a productive country and consumed huge resources to build and maintain its fleets.

While immeasurable riches were flowing to Spain from the colonies, neither the Church nor the government had any interest in raising the education level of the population. As long as the elites were provided for, both the Church and the state considered the education of ordinary people to be unnecessary or even dangerous.

That did not change even after the Netherlands and England began to rival the Kingdom of Spain for the place of leading colonial power: when Spain lost its Latin American colonies in the 19th century, it returned – with the exception of Catalonia and the Basque country – to the status of a poor agricultural country. Even in 1860, three out of four Spaniards were still illiterate.²⁶

The decline of the world power Portugal was even more dramatic. After losing its overseas territories in Brazil, it became the poorhouse of Europe, for the Portuguese had invested none of the wealth they had plundered from their colonies in the education of their own people. Around 1900 an estimated 80 percent of the population of Portugal could neither read nor write. The economy was dominated by a few families and major landowners. Later a large part of the state budget flowed into hopeless colonial wars in Angola and Mozambique. How poor the living conditions on the western edge of Europe were as recently as in 1950 is shown by the fact that the life expectancy of the Portuguese was less than 60 years at that time – about the same as in Africa today.

Parallel to the decline of the Catholic colonial powers of Spain and Portugal, the Protestant-dominated Netherlands and England experienced a huge boom. Statistics from the Netherlands show that already around 1600 two thirds of men in the cities could read and write. Around 1850 about 80 percent of the population, including those in rural regions, were literate. They had thus experienced considerable growth in human capital. The same thing happened in England where, at around 1800, 60 percent of all men and 40 percent of all women could read and write. By 1900 the figures had reached almost 100 percent for both sexes, with a total population of around 40 million in the United Kingdom as a whole. The combination of the large number of people and disproportionately high level of education was a decisive factor in building the British Empire. Without being able to harness the power of this knowledge and put it to work in the interests of a centrally controlled colonial power, it would never have been possible to build functioning administrations in the various colonies in far-flung regions of the globe or deploy the military resources to defend them.

The economic and political influence of the states is reflected in the map of Europe around 1870 produced by the Cambridge Economic History Group. This map shows the estimated extent of literacy among the European population.²⁷ The Protestant territories of Sweden, Germany, the Netherlands and Great Britain are

26 Frago, V. (1990): The history of literacy in Spain: Evolution, traits, and questions. *History of Education Society*, 30 (4): 573-599.

27 Broadberry, S., and O'Rourke, K. (2010): *The Cambridge Economic History of Modern Europe*, Vol. 1. 1700-1870, Cambridge: Cambridge University Press.

undisputed leaders with literacy rates of around 80 percent. They are followed by mainly Catholic France, which had caught up following the French Revolution and between 1820 and 1870 managed to raise its literacy rate from 38 percent to 69 percent. Austria and Ireland rank after France. Italy and Spain lag a long way behind with rates below 35 percent. Russia reaches 15 percent literacy and Turkey 9 percent.

This education-based ranking in the Europe of the 1870s reflects the degree of economic development and affluence almost exactly. Basic education was a key precondition for the successful spread of the Industrial Revolution and the administrative and economic infrastructures required for this, from railways to a safe supply of drinking water.

Did the Protestant ethic help?

At the beginning of the twentieth century the German sociologist and economist Max Weber (1864-1920) asked himself why the Industrial Revolution and capitalism had evolved in the Western world and not, for instance, in Asia, and why these two trends had not emerged much earlier. In the light of the obvious differences in development between the Protestant and the Catholic regions of Europe, Weber came up with the thesis that the so-called “Protestant ethic” has been responsible for the success of these cultures.²⁸ In reality, however, Weber was thinking mainly of the ethic and the industriousness of the ascetically inclined Calvinists. In his famous work *The Protestant Ethic and the Spirit of Capitalism* (1904) he expounded a complex line of argument according to which one’s “calling” and the perceived duty to God which it implied had played an important role in generating progress, because they created an incentive to work hard. “Entrepreneurial thinking” and the “spirit of modern capitalism” came more naturally to Protestants than to Catholics, Weber wrote, and this was why they were more successful. This work, which sets out to explain the links between culture and economy, is still today considered one of the great classics of sociology. But in fact Weber’s theory does not get to the crux of the matter.

The economic head start of the Protestant regions can be much more easily explained in terms of the better-educated populations in those countries, with statistics backing this up. The German economists Sascha Becker and Ludger Wössmann showed that this was the case by looking more closely at historical data

28 Weber, M. (1934): *Die protestantische Ethik und der Geist des Kapitalismus*. 6. Auflage. München: C.H. Beck.

from 29 European countries for 1900 and from 452 Prussian counties for the years 1871 und 1880. Their findings bear the telling title *Was Weber Wrong?*²⁹

The size of the Prussian territories during this period meant that some counties were predominantly Protestant, others predominantly Catholic and some mixed. The 1871 census was the first to systematically record the degree of literacy of the population. The descriptive analysis already shows that there were fewer illiterate people in those areas where there were more Protestants. Indeed, the literacy rate in Protestant areas was on average ten percentage points higher than in Catholic areas. After performing some complex statistical evaluations, the researchers come to the conclusion that the Protestant areas were not more successful because people were more industrious or because they regarded economic prosperity as a sign of godliness – in other words, because people were living according to what Max Weber had termed the “Protestant ethic”. Rather, “the higher level of education can wholly explain the economic advantage of the Protestants”. As Ludger Wössmann put it: “We don’t require any specific ethic for this.”³⁰

The data analysis also shows that, as Protestantism spread from Wittenberg, it brought education in its wake. In other words, the closer a Prussian region lay to Wittenberg, the higher the level of education. The Catholics who lived in these regions were also able to benefit from better school provision. In addition, school attendance by girls was highest in those areas with the greatest proportion of Protestants.

The United States becomes an education superpower

In 1904/05 Weber wrote an essay following a study trip to the United States. In the early 20th century the United States was a mainly Protestant country with the highest education levels in the world. Historical statistics show that white Americans born between 1876 and 1880 had on average eight years of school and university education.³¹ And women were only slightly behind men. The average school and university attendance then rose in an almost linear pattern to 14 years for the 1950 cohort. Thus after the Second World War the United States had by far the best-educated population in the world. This was probably the main reason why in the course of the 20th century the United States not only became the world’s leading economic power, but also its only political superpower.

29 Becker, S.O., and Wössmann, L. (2009): Was Weber wrong? A human capital theory of protestant economic history. *The Quarterly Journal of Economics*, 124 (2): 531-596.

30 *Die Zeit* (13.05.2009): Bildet Euch! Interview mit Ludger Wössmann. <http://www.zeit.de/2009/01/C-Interview-Woessmann/seite-2>

31 Goldin, C., and Katz, L.F. (2008): *The Race between Education and Technology*. Cambridge: Harvard University Press.

The huge expansion of education in the United States had already begun back in the late 19th century. Starting in New England in 1850, all the federal states one after another not only introduced compulsory schooling, but also abolished school fees. Unlike today, when most good high schools charge fees, the expansion of education in the United States was organised and financed primarily by the state and was free. And unlike in Europe, the first wave of primary school education was followed by two others. The first was the high school movement, which began around 1910, when roughly 10 percent of a cohort already finished high school, in other words attended school until the age of 18. That was already a much higher share than in Germany two decades later, at the beginning of the Second World War. By 1920 around 20 percent of a cohort were finishing high school and by 1940 the figure had risen to 60 percent.

The surprising thing is that, right from the start, there were more female high school graduates than male. This impressive education initiative was then followed by a third wave, the college movement. As more young people finished high school, an increasing number registered to study at a university: 20 percent of a cohort in 1930 and almost 50 percent by 1950. Here, too, the women had caught up by the mid-20th century.³²

US education data cannot be directly compared with data from Germany, Austria or Switzerland, since the education systems in the latter countries place more emphasis on vocational training, for which Abitur (A level or high-school certificate equivalent) or a university degree is not required. Nevertheless, at the beginning of the 20th century, the differences between Germany and the United States were still enormous. Practically all children in Germany attended primary school, but the number of young people obtaining Abitur was very small: only about 1 percent per cohort around 1900 and no more than 4 percent in 1950.

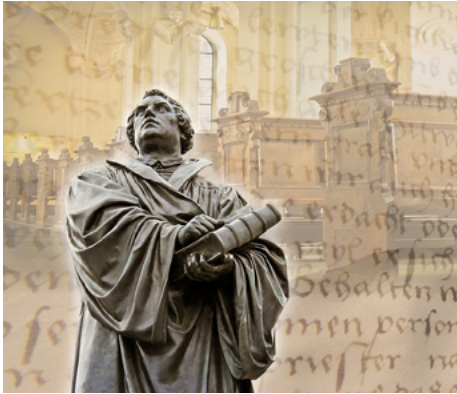
These figures shed new light on a question often posed by American researchers: namely, how the apparently so well-educated Germans could have allowed Nazi barbarism to happen? How could a country that had generated scientific luminaries and Nobel Prize-winners such as Max Planck, Fritz Haber, Werner Heisenberg, Otto Hahn, Lise Meitner or Albert Einstein also be capable of planning the Holocaust? Part of the explanation might be that, unlike in the United States, the high level of research and technological progress was limited to a small, highly qualified elite and that National Socialism as a mass movement relied on a population with a comparatively low level of education that easily fell prey to Nazi propaganda –

32 Goldin, C., and Katz, L.F. (2008): *The Race between Education and Technology*. Cambridge: Harvard University Press.

perhaps because of a few highly educated fanatics –than a more educated population would have done.

In their comprehensive history of education and technology the Harvard economists Claudia Goldin and Lawrence F. Katz come to the conclusion that the United States became the world’s wealthiest and most influential nation mainly because of education. The 20th century was, in their view, not only the much vaunted “American century”, but also the “American human capital century”.

Whether the United States will manage to maintain this leading position is, of course, a different question. Education levels in the United States have been stagnating since 1980, even declining in the recent past, whereas in East Asia they are rising all the time. History has shown that a political and economic advantage does not necessarily last forever. Moreover, nowadays more than ever it depends on the manifold skills of a broad section of the population, on what economists call “human capital”.



3

FROM DIREST POVERTY TO ECONOMIC PROWESS

How human capital produces success stories

Why do some cultures flourish while others fail? Why do some cultures surpass others? These are questions scholars have long been trying to answer. Why, for example, has Arab civilisation, which once covered an area stretching from Portugal to Baghdad and beyond, paled into insignificance, when around 1,000 years ago its achievements in most fields of art and science were far superior to those of Christian Europe of the Middle Ages? Why are the people of Europe, North America and some industrialised states in East Asia currently doing the best job of shaping their social and economic environments and hence their welfare in line with their own ideas?

In this chapter we seek to explain which cultures and nations were able to benefit from the principle of mass literacy that generated the initial education successes in the wake of the Reformation and how this enabled them to evolve into modern, affluent and well-organised societies. In the next two chapters we look at those countries that for whatever reason have neglected to provide education for all. These are the two opposing camps in the clash of education cultures.

There are many theories about why societies succeed or fail. Some people hold external factors such as the climate or geographical location responsible; others believe it is a matter of chance or is culturally determined.

In the past, development paths were certainly more subject to external influences than they are today: territories with unfavourable natural conditions, such as a hostile climate or poor soil, obviously had a harder time developing than those in temperate zones. Geographically remote regions lacking natural resources and with no access to the sea were at a disadvantage too. The Inuit in the Far North, for example, would never have been able to invent agriculture and establish an advanced civilisation of the kind that evolved in Mesopotamia between the Tigris and Euphrates rivers or in the rice-growing areas of East Asia. Likewise, Middle Eastern or European-style agriculture was impossible in sub-Saharan Africa because of the Tsetse fly, which infects domestic animals with the deadly sleeping sickness and thereby makes it difficult for farmers to use animal-drawn ploughs.¹ Cultures flourished in those places where there were wild plants and animals suitable for domestication.²

But is it really external factors of this kind that determine the success or failure of cultures? Not all scholars believe so. The American sociologist and political scientist Jack Goldstone, for instance, thinks it is more a matter of chance. To illustrate his theory, he traces the different paths of development taken by China and Europe since the 16th century.

Until half a millennium ago the two regions were roughly on a par in terms of development, but then Europe suddenly forged ahead. What Europe had but China did not was the Catholic Church – an accident of history, according to Goldstone. Unlike cultures in Asia and the Middle East, in the late Middle Ages the Church still held a view of the world that was at odds with the new discoveries being made, giving rise to opposition and ultimately resulting in the Reformation. Protestantism spread throughout Europe, albeit in England once again only by coincidence. If the Protestant William III of Orange, Stadtholder of the Netherlands and through with his wife, Mary, king of England, Ireland and Scotland, had not ousted the Catholic King James II at the Battle of Boyne in 1690, England would have become Catholic again. Only under the protection of the capitalist-oriented Protestants was it possible for the Industrial Revolution to take place in England, later spreading to other countries of Europe. This would never have happened under Catholic rule, according to Goldstone. A chain of coincidences thus brought Europe a key

1 Alsan, M. (2015): The effect of the tsetse fly on African development. *American Economic Review*, 105 (1): 385-410.

2 Diamond, J. (1997): *Guns, Germs and Steel: The Fates of Human Societies*. New York: W.W. Norton.

developmental advantage. And because coincidences of this kind did not happen in China, Europe was able to evolve into an industrial power much earlier.³

Under what conditions do cultures flourish or fail?

The problem with such theories is that they are almost impossible to prove. Most researchers therefore tend to espouse one of two schools of thought with respect to development theory.

Some believe that certain peoples and cultures develop differently because they are fundamentally different. Using politically incorrect terms, we would say: some cultures are smart enough to make it, while others are fundamentally incapable of following successful models. This assertion formed the starting point for the book *The Clash of Civilisations* by the US political scientist Samuel Phillips Huntington, who died in 2008. Huntington believed that because of irrevocable cultural and religious differences, societies would go in divergent directions, which would inevitably result in conflicts, for example between the Arab and the Western world.⁴

Other scholars assert that all societies basically develop according to the same universal pattern but with a time lag, so that today individual countries are simply in different phases of development. Karl Marx, for example, believed that social systems followed a fixed sequence. In his view European culture had progressed from antiquity through feudalism to capitalism to a point where a proletarian revolution would inevitably lead to a classless society, and he also believed all non-European cultures would eventually follow the same path. Many people were convinced by his theory and tried by every means possible to create an egalitarian world. Yet, as history has shown, organised revolution of the proletariat (in the Soviet Union, the GDR, China or North Korea) led neither to greater equality nor to economic prosperity, and in fact other cultures managed by quite different means to minimise social differences and create mass wealth (the Nordic countries, for example).

A much clearer, more plausible development theory, which has been empirically corroborated on various occasions, is the special theory of demographic transition. It too assumes a universal development model for all regions of the world, but once again with a time lag. This theory states that in all traditional societies, many children are born but at the same time many people of every age die and therefore the size of the population hardly changes. Only when improved living conditions reduce the death rate, while the birth rate remains high, does the population start

3 Goldstone, J. (2008): *Why Europe? The Rise of the West in World History 1500-1850*. New York: McGraw-Hill.

4 Huntington, S.P. (1997): *The Clash of Civilisations and the Remaking of World Order*. London: Simon and Schuster.

to grow strongly. This trend began in Europe and North America in the late 19th century and in the developing countries directly after the Second World War. The theory goes on to say that when birth rates fall as well – after a certain delay and as a consequence of growing prosperity and education for women – population growth will decline and ultimately cease. This phase of development is largely over in all the industrialised states of Europe, North America and East Asia, while in other parts of the world it is still in full swing and in some countries of Africa it is only just beginning. The theory of demographic transition is so far the only one that provides a generally valid explanation for the development paths of all nations.

As far as we know, this development takes place in all human societies irrespective of geographical location, skin colour, religion or culture. The phases of development always follow in the same order, and the decline in the birth rate is irreversible. We know of no country in which social modernisation has taken place but people have continued having as many children as they did in the past. The only differences between individual countries is how far they have progressed along this development path.

The question that remains open in this phase model of modernisation is what circumstances caused the process to begin earlier in some regions than others, in Europe much earlier than in Africa, for instance. Many scholars believe long-term cultural development may have had a role to play here, for example, the linear development of Western culture from the Greek philosophers to the Roman Empire and the Renaissance. Along the way so much knowledge was accumulated that the probability of further progress was high, although theoretically the West could still have failed. And, indeed, it was on this basis that what were for a long time the technically and organisationally superior Western societies emerged.

Yet this theory, like the others, still lacks a plausible explanation for why things took a particular course at a particular point in time in the various regions of the world. Thus none of the theories mentioned has much predictive power. For this reason, we chose a different approach for this book: we asked what, historically, were the most important preconditions that all societies of the modern age had to fulfil in order to embark on the road to success.

Where are the roots of development?

Our thesis is that the *external* factors for development, such as climate, geographical location or access to trading routes, declined in significance in Europe around 500 years ago. And instead, slowly but surely, an *internal* factor for development came to prevail: the expansion of education from a small elite to broad sections of the population. Like the demographic transition described above, this education revolution began at different times in different countries. Where it happened, the

result was a modernisation of society and the economy, irrespective of geography, religion or culture.

Because none of the development theories mentioned attribute any special significance to the education factor, we intend in this chapter to illustrate historically the influence of broadly based education through portraits of a number of very different countries that have managed in a relatively short period to lift themselves out of poverty through using their own human resources.

Finland – from the sauna to PISA

In the late 19th century Finland was still one of the poorest regions in Europe. The harsh climate, the acid peat soil and the short growing season made life tough for farmers. In this sparsely populated country only a few cities emerged, so there was little opportunity to earn money through trade. Linguistically isolated, the Finns were for many centuries pawns in the power struggles between the great powers Sweden and Russia. For 700 years Russia repeatedly tried to occupy the Swedish-controlled areas of the Finnish peninsula. In 1809 the Grand Duchy of Finland even became part of the tsarist empire and the capital was moved from Turku to Helsinki. Only at the end of 1917 did the Finns gain independence in the wake of the Russian Revolution.

In economic terms Finland had practically nothing to offer for a long time. The only plentiful commodity was trees and even they grew much more slowly in the harsh northern climate than they did further south. Originally, tar was the only export. The Europeans needed the black sticky substance for caulking – the process of sealing the gaps between the planks of a ship. Almost everything that did not grow in the barren fields or in the forest had to be imported by the Finns, if they had the money to do so. The simple huts and houses where the farmers lived did not even have chimneys. Instead, in most dwellings the fire could be found smoking in the middle of the only room. Because of the cold there was no ventilation and the Finns slept on wooden plank beds on the floor, the only part of the house that was more or less smoke-free.

Traditionally, Finns were born in the sauna and returned there to die. It functioned both as a washroom and as protection from the cold. When a piece of forest was cleared to build a new farmhouse, the Finns always started by building a sauna hut, traditionally a smoke sauna without a chimney. In the sauna, they lit a fire and laid stones on it. As soon as the flames had died down and the smoke had dissipated, they poured water on the stones. Through the high temperatures thus achieved, they inadvertently created a very sterile environment. For this reason, sauna births had a very low rate of infection and from an early stage infant and maternal mortality was lower in Finland than in other countries.

As in all traditional cultures, the Finns had many children. The Finnish population therefore grew rapidly but was repeatedly decimated by famine and war. The Great Nordic War between Sweden and Russia, which lasted from 1700 to 1721, destroyed and depopulated large parts of the country. A notable fact is that directly following the peace treaty, signed by the two countries in the small west Finnish port city of Uusikaupunki (Swedish: Nystad), Finland became the first country in the world to introduce modern population statistics. To do so, it centralised the local registers of births and deaths and the “state of souls” registers of the churches. A census was conducted to ascertain the composition of the population and hence to provide the basis for the reorganisation of the country. Finland therefore has the longest continuous annual time series for population development in the world. The statistics show how rapidly the population grew in the century after the war: the number of Finns quadrupled from 421,000 to 1.64 million between 1750 and 1850. It became almost impossible to feed so many people and the farmers had to convert more and more forest into arable land.

How hard life was in this difficult era is memorably described by Aleksis Kivi in his novel *The Seven Brothers* from the year 1870. It was the first novel ever to be published in Finnish, for until then Finnish had been the language of the farmers and ordinary people, while the aristocracy and the middle classes spoke Swedish. Only the Bible had been available in Finnish since 1537, having been translated at the time of the Reformation by Michael Agricola, a pupil of Luther and later bishop of the old capital, Turku. It was his translation that established Finnish as a written language.

The Seven Brothers is still considered the classic of Finnish literature. It tells the story of seven young men who have lost their parents and inherited their farm. Having no desire to lead a regular life, they decide instead to retreat into the woods as a band of blood brothers, in order to lead a wild and carefree existence. They quarrel and drink, kill bears and wolves and feel like heroes. Only after many years do they come to their senses, settle down and start families.

For the reading public of the time, the novel was nothing short of scandalous. The rough way of life and the coarse, uncouth characters Kivi described were completely alien to the upper classes. The book was dismissed as a disgrace. What most readers failed to recognise was that the story of the brothers was, in fact, an allegory for the development of Finland from a barbaric country to a Christian civilisation. The publication of the novel coincided with a period of radical change in Finland.

Between 1866 and 1869, Finland had suffered a terrible famine, often described as the last great “natural” (i.e. not politically motivated) food crisis in Europe. In 1867, after several poor harvests, there was no proper spring or summer. The snow

remained on the fields until June and the temperature remained eight degrees below the long-term average. The potatoes rotted in the earth and the grain refused to ripen. The first frost came at the beginning of September. For most farmers this meant a complete failure of the harvest at a time when reserves from the previous year had already been used up. The population could expect help neither from Sweden nor from Russia, of which Finland was then part. The famine was followed by epidemics to which people easily fell prey in their weakened state.

The famine is documented in the demographic statistics: within three years, it claimed 270,000 lives, more than 15 percent of the population. Children were particularly vulnerable and almost half of them died. The country seemed to be caught in a vicious circle of high population growth, poverty, hunger and epidemics.

In this dire situation the Protestant Church of Finland, to which almost all Finns belonged, took a decisive step. It decided to espouse the Lutheran principle of education for all and, together with the state administration, to teach the utterly impoverished population to read and write. It was a desperate attempt to civilise the people.

The education reform was an incomparable feat: everywhere the government had schools built and teachers trained. In the 40 years between 1870 and 1910, the number of primary school teachers increased twenty-fold to more than 10,000.⁵ At the same time the Church used its influence on people's everyday lives. Anyone who wanted to marry – both bride and groom and irrespective of social position – had to read out loud a page from Luther's small catechism. If they were unable to do so, they did not receive a licence to marry. Since at that time sex was considered legitimate only within marriage, the Church thus created a major incentive to learn to read.

The success of these gently coercive measures was impressive: by the early 20th century practically all of Finland's younger population – those who were able to benefit from the new schools, in other words, both women and men – was literate. The drive for education had all kinds of repercussions.

First of all, it led to a decline in the birth rate, for basic education broadened people's horizons, leading them to plan the size of their families. The average number of children born to Finnish women fell from more than five at the end of the 19th century to around three – even without modern contraceptives. The story of Finland provides a powerful argument for the theory that a historic fall in the birth rate depends essentially on access to education. Other reasons proposed by scholars for such a decline – such as greater prosperity, urbanisation or individualisation – could not have played a role in Finland of that era. The Finns neither became more

5 Lutz, W. (1984): *Finnish Fertility since 1722: Lessons from an Extended Decline*. Helsinki: Finnish Population Research Institute.

affluent, nor moved into cities nor started to live alone. The only thing that changed significantly during this period was education, especially education for women.

Second, as women obtained a better education, their social aspirations grew. This was the time when the first women's rights movements emerged, especially in Protestant countries. In 1906 Finland, which then still was a Russian grand duchy, became as a consequence the first territory in Europe to introduce the right for men and women over the age of 24 both to vote and to stand for election. Prior to that only Finnish men of the higher social classes had been able to vote. In 1907, the first elections to the Diet of the Estates, 62 female candidates stood for election. Nineteen of them entered the new parliament, which comprised 200 representatives.⁶

Third, the literacy campaign and the tradition of reading, which was rooted in the Reformation, laid the basis for further education. After building primary schools, the Finnish government went on to continually expand secondary education. As a consequence it became possible for an increasing number of young people to complete secondary education. By 1970, what is more, the number of young women graduating from high schools had exceeded the number of men. At the same time the government realised a major education reform whereby the previously multi-track school system became an integrated one. Since 1972 all pupils in a cohort have been taught together for the first nine years. In addition, the schools gained considerable autonomy. Within a given framework, they could decide on their curricula themselves and choose their own teachers. All state schools are regularly inspected, which has led to positive competition between schools.

Continuing the tradition of early literacy, Finnish schools place particular emphasis on improving reading skills, alongside learning science and acquiring a command of foreign languages. The first foreign language is introduced in the third year of school. By the time they have completed the first nine years of school, all young Finns have learned at least two foreign languages. Weaker students receive extra help.

In view of this exemplary education policy, it is not surprising that when the OECD conducted the first PISA (*Programme for International Student Assessment*) study of educational achievement in 2001, Finland came out top in almost all fields. The PISA study is conducted every three years and examines the competence of 15-year-olds in reading, mathematics and science. Since the study began, Finland's pupils have shown above-average achievements in all areas tested and Finland has always occupied one of the top four places in the league table. In the mathematics section of the 2012 PISA test, Finland fell back slightly ranking below China, Singapore, Taiwan and South Korea. In the meantime China has taken the lead in all areas. The

6 Botschaft von Finnland in Berlin (2006): 100 Jahre Parlament und Frauenwahlrecht in Finnland, <http://www.finnland.de/public/default.aspx?contentid=121123&>

results for China are distorted, however, since only pupils from the booming city of Shanghai participated in the tests.⁷

Fourth, with the increase in education, Finns' health improved too. This is most obvious from the improved life expectancy, which rose for women from 42 around 1880 to 50 in 1910 and 68 in 1950. Now it is 84, twice as high as in 1880. The Finns recognised early on that education and health should be considered a joint area of development. As early as the 1920s the charismatic paediatrician Arvo Ylppö began to build a network of children's health centres, which were not only concerned with medical issues such as vaccinations but were also intended to promote children's intellectual and social development. Nowadays almost every municipality has an advisory centre for this purpose, the *Neuvola* which employs a team of doctors, nurses, speech therapists, ergotherapists, psychologists and social workers. It is usually located next to the community hall and is thus easily accessible for everyone. In the first two years of a child's life parents visit the *Neuvola* with their offspring about once a month.

During the visit staff attend not only to the child but also to the parents. Aware that the arrival of a child means a major change in lifestyle, they address financial or relationship issues, for instance. The payment of a child benefit used to be tied to attending the *Neuvola*, but today visits to the *Neuvola* are such a matter of course that this requirement is no longer necessary.

The sustained success of Finland's major literacy campaign contradicts a widely held perception among economists that education makes sense only if it brings economic benefits to those concerned.⁸ This school of thought holds that education is a commodity that people are motivated to acquire if they believe they will later earn good money with it. But for the young rural population of Finland wishing to marry in the final years of the 19th century, learning to read and write did not offer any obvious economic benefits. In a society consisting of small farmsteads where farmers used simple agricultural implements, education was not of much use. People learned to read and write only because the Church told them to do so and because they would otherwise not have been able to marry. The benefits of education became evident only over the course of time – but then with enormous clarity.

Today, Finland is one of the world's wealthiest countries, despite its remote geographical location, its linguistic isolation and its low population density. Its economy is modern, successful and future-oriented, and the country is a leader

7 OECD (2014): PISA 2012 Results in Focus: What 15-year-olds know and what they can do with what they know, <http://www.oecd.org/pisa/keyfindings/pisa-2012-results-overview.pdf>

8 Easterly, W. (2013): *The Tyranny of Experts: Economists, Dictators, and the Forgotten Rights of the Poor*. New York: Basic Books.

in many sectors, including information technology, forestry, paper-production machines and timber processing.⁹ In the field of mobile telecommunications Finland, with its tiny population, long dominated the world market through Nokia. And even if Nokia has lost its former glory, it is still the country's largest company and currently employs around 66,000 people worldwide.¹⁰ Southern Finland has one of Europe's highest levels of expenditure on research and development relative to GDP. And the Finns have an enormous pool of highly skilled people on which to draw.

Here, too, we see the value of early investment in education for both men *and* women. Today 47 percent of Finnish women between the ages of 25 and 34 have a university education, more than in any other EU state apart from Sweden. The country has 20 universities, none of which charges fees.

In the Global Competitiveness Index of the World Economic Forum for 2014-15, Finland occupies fourth place behind Switzerland, Singapore and the United States. Whereas Switzerland and the United States were already far ahead 100 years ago, Finland and Singapore are two of the most successful late developers. The Southeast Asian city state likewise developed from a backward country into a high-tech metropolis, much faster even than Finland did.

Singapore – from opium den to science mecca in fifty years

When Singapore left the British Empire in 1963 and, after a brief federation with Malaysia, became independent in 1965, the young state already had a major port and was an important trading hub between the East and West. Its population was a multicultural mix of Chinese, Malays, Arabs, Europeans and Indians. At the same time it was still a humid, malaria-infested tropical metropolis full of brothels and opium dens, suffering from mass unemployment and over 50 percent illiteracy. The residential districts of the city were strictly ethnically segregated. Women had an average of almost seven children and annual per capita income was the equivalent of US\$ 427. Moreover, when it separated from Malaysia, Singapore was initially cut off from its hinterland.

In 1959, against this backdrop, the former crown colony began to govern itself and the Singapore-born lawyer Lee Kuan Yew took charge. Lee was from a wealthy Chinese family and had been educated at Cambridge. He was to become the world's longest-serving prime minister, retiring from office only in 1990. Lee's vision was to

9 Finnfacts 2001, Die Finnland Story, II. *Finnland heute* www.finnfacts.com/german/country/story/heute/index.html

10 Forbes, The World's Biggest Public Companies, <http://www.forbes.com/global2000/list/#country:finland>

lead Singapore out of poverty through a combination of Confucian values, Western education and flawless capitalism. His style of leadership was as authoritarian as it was efficient.

In the early years his policies were geared towards a rapid expansion of the education system and job creation. A particular challenge was to quickly train teachers, of whom there were far too few. But by 1970 practically all children were receiving a primary school education. Prime Minister Lee introduced English as a lingua franca to allow all the different ethnic groups to communicate with one another, but children were also instructed in their mother tongue so that they would not lose touch with their roots. In order to supply the rapidly growing industry with technically skilled labour, Singapore made large scale investments in secondary education, which were followed directly by a huge expansion of the universities.

Singapore started out by earning money from simple industrial products, but this was not to last long. By the 1980s the city-state was well on the way to becoming a knowledge society. Today almost 80 percent of a cohort are university graduates, a world record and on a par with South Korea. In addition, the excellent universities are now attracting around 100,000 foreign students to Singapore.¹¹ Within 50 years Singapore has managed to leave behind its past and has risen to become one of Asia's leading tiger states. With 5.5 million inhabitants, it is now *the* leading science and research location in Southeast Asia, boasting four universities and two more planned.¹² These institutions are global leaders in IT, biotechnology and medicine. About 1 million foreign patients receive treatment in Singapore every year. Around half of all exports from Singapore are high-tech products, three times as many as Germany's exports.¹³

The knowledge society Singapore is preparing itself for the challenges of the 21st century at all levels. No city within a radius of a couple of thousand kilometres is cleaner, no industry makes more efficient use of natural resources, nowhere are the targets to reduce energy consumption or eliminate rubbish more ambitious. Waste water is 100 percent recycled, there are no slums, and corruption is almost unknown. Even the traffic in the megacity runs smoothly, thanks to a perfect bus and train system, and intelligent restrictions on private cars. In no other country in

11 Ministry of Education (2015): *Education Statistics Digest 2014*. Singapore: Ministry of Education.

12 Auswärtiges Amt (2016): Singapur: Kultur und Bildungspolitik, http://www.auswaertiges-amt.de/sid_9F9AFF0FD16A131163A8D5F630C9806C/DE/Aussenpolitik/Laender/Laenderinfos/Singapur/Kultur-UndBildungspolitik_node.html#doc400140bodyText3

13 The Atlantic (12 May 2012): Singapore: Miracle at the Center of the World, <http://www.theatlantic.com/business/archive/2012/05/singapore-miracle-at-the-center-of-the-world/257082/>

the region do different ethnic groups and religions coexist as peacefully as they do in Singapore.

Because the pace of development has been so rapid in recent years, the high level of education is currently evident only among the younger generations. Only they have benefited from the education drive since the 1970s, while the older cohorts have been excluded. Until the mid-1980s visitors to Singapore found a two-class society, albeit one with a division not between the upper and lower classes but between generations. In 1985, anyone aged 20 to 35 already spoke perfect English and had attained a level of technical knowledge above that in many parts of Europe. Those over 45, by contrast, mostly lived away from the gleaming facades of the megacity, in the dark alleys of Chinatown or Little India. These people had rarely been to school and spoke hardly a word of English.

These representatives of the old Singapore were slowly but surely being replaced by those from the new Singapore, who possessed completely different skills. Gradually, the better-qualified cohorts were moving up the age pyramid. This phenomenon of change from one generation to the next is also called “demographic metabolism”, because society changes qualitatively over time. On this basis it is possible to predict how Singapore society will change over the coming decades.¹⁴ What is already clear today is that the city-state will continue to expand its position as a centre of knowledge and innovation.

The education revolution is, of course, also reflected in economic growth and in the level of affluence. Annual per capita income rose from US\$ 427 in 1960 to US\$ 5,000 in 1980 and by 1995 had reached US\$ 25,000, overtaking that in its former colonial ruler Great Britain. Today, with an average per capita income of US\$ 55,000, Singapore has surpassed even the United States.¹⁵ Parallel to this, the number of children per woman has fallen from almost seven in 1960 to 1.3 today. Infant mortality, which was at the same level in Singapore in 1965 as it is in North Korea today, has now sunk to one of the lowest levels worldwide. Average life expectancy is one of the highest in the world at more than 82, whereas in 1957 it was only 57.

Mauritius – from “hell on earth” to a paradise in the Indian Ocean

That a strategically located trading centre like Singapore can, with the help of foreign direct investment and under the right conditions, develop in a favourable direction is perhaps understandable. But can a small island in the middle of the Indian Ocean,

14 Lutz, W. (2012): Demographic metabolism: A predictive theory of socioeconomic change. *Population and Development Review* 38 (Supplement): 283-301.

15 The World Bank: World Development Indicators, GDP per capita in current US\$. <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

living from sugar cane plantations, do the same? Especially when it is plagued by tropical cyclones and is located 2,000 kilometres from the nearest continent?

Mauritius first appeared on European maritime maps around the beginning of the 16th century, after being discovered by Portuguese seafarers (Arabs had been there already) looking for a sea passage to India. They were glad to find drinking water and giant tortoises to replenish their provisions. But the island was really settled only when the Dutch East India Company made it a base on the long voyage from Europe to Indonesia in 1638.

Back then, Mauritius was inhabited by around 200 settlers and 1,000 slaves. They had already cut down all the trees suitable for shipbuilding. In 1715 the French conquered the island and brought more settlers and slaves for the sugar cane plantations. In 1810 the British took over. This marked the beginning of a population explosion caused mainly by people from other parts of the British Empire settling in Mauritius. Soon the island had 100,000 inhabitants, 80 percent of them African slaves. The Empire banned slavery there in 1835 and, because the majority of the freed plantation workers ceased to work in the fields of their former owners, the British recruited Indians on a large scale between 1834 and 1839. Although they had employment contracts, they were treated almost as badly as their slave predecessors; among other things, their return tickets to India were withheld. In the ten years between 1851 and 1861 alone more than 100,000 Indians arrived in Mauritius. Since the island is only 2,000 square kilometres in area (smaller than Yorkshire) and some of it is wild mountain country, the scope for agriculture has always been limited. Moreover, the sugar cane monoculture was very vulnerable to price fluctuations on the world market.

The 1962 census records a population for Mauritius of 681,619. Most of those people lived in extreme poverty and women had on average more than six children. The growth rate of the population was around 3 percent a year, which meant the number of inhabitants would double in only 23 years – a bleak prospect for a country already on the brink of disaster. Mauritius seemed to be caught in a similar situation to that of Finland in the 18th century.

Concerned about this situation, the British colonial administration decided before the transition to independence, which finally came in 1968, to send experts to advise the Mauritian government. In 1960 the prominent English social researcher Richard Titmus arrived in Mauritius with a team to try to come up with proposals to improve the situation. Just prior to his arrival on the island, one of the frequent cyclones had left behind a trail of destruction. Titmus is alleged to have spoken of “hell on earth”.

At almost the same time an economic delegation led by the Cambridge economist and future Nobel Prize winner James Edward Meade came to Mauritius to give advice on economic policy. The two teams drafted comprehensive economic and social policy concepts which contained two central yet controversial recommendations: build more schools and introduce family planning.

The government itself was at the time trying to solve the problem of the rapidly growing population by encouraging people to emigrate. But this proved ineffective as the large numbers of children quickly filled the gaps again. Family planning was taboo for religious reasons, particularly in the Catholic Church, to which the influential French landowning class belonged. But Muslim groups were sceptical as well. Only the Hindu majority of Indian origin were open-minded on this question. Almost all Hindu women were illiterate and, with an average of more than seven children, had the highest fertility rate of all ethnic groups on Mauritius.

But despite all these reservations, the studies by Titmus and Meade ultimately succeeded in convincing the Mauritian parliament. Given the island's location, the limited space for settlement and agriculture, and the lack of a "hinterland" into which the population could have expanded, something had to be done. The parliamentary minutes show that even the Catholic and Muslim MPs were won over by these arguments and decided not to torpedo the family planning programme that had begun in 1962.¹⁶ The Catholic Church even founded its own family planning organisation, *Action Familiare*, which, however, propagated only natural methods of contraception.

The comparatively liberal attitude of the Catholic Church may seem surprising today, but was in fact in line with the internal position of the Vatican at the time. A papal study commission charged by Pope John XXIII with addressing the question of population growth and the regulation of births had concluded that contraceptives like the new pill at that time should not be rejected out of hand, but natural methods were to be favoured. A majority of an episcopal commission charged by John's successor, Paul VI, spoke in favour of leaving the choice of method to the couple themselves. In this situation the Catholic Church in Mauritius, in particular its Vicar General and later Cardinal Jean Magéot, regarded themselves as basically adhering to Catholic doctrine. It therefore voted in favour of introducing an effective state family planning programme offering the full range of methods – with the exception of abortion.

It was not until 1968 that Pope Paul VI presented his encyclical *Humanae Vitae* – known popularly as the "pill encyclical" – which condemned "any action which

16 Lutz, W. (Ed.) (1994): *Population-Development-Environment. Understanding their Interactions in Mauritius*. Heidelberg: Springer.

either before, at the moment of, or after sexual intercourse is specifically intended to prevent procreation”.¹⁷ This meant, in other words, than any unnatural method of contraception was classified as a sin. Against the recommendations of the papal commission, Paul VI thus tried to reverse the wheel of history. But in Mauritius, at least, he had long since been overtaken by events.

Between 1963 and 1972, Mauritius experienced the most rapid decline in fertility of any country in history so far – and this solely through the methods offered through the state family planning programme without any pressure or coercion. The average number of children per woman fell within these ten years from 6.2 to 3.3. Among Hindus it fell by more than half, from 7.1 to 3.5. The reduction among the Chinese was even more dramatic, from 5.5 to 2.1. The other ethnic groups soon followed suit and today Mauritius has by far the lowest fertility rate in Africa with 1.4 children per woman, which is even below the European average. The problem posed by population growth had been practically solved within a single generation.

Once again, an important reason for this achievement was education. Women with a basic education were able to be more assertive vis-à-vis their husbands, who particularly in poor countries traditionally wanted very large families. Indeed, the decline in the birth rate had been preceded by a government education programme, which had an especially strong impact on the life of women: in 1962 80 percent of 15- to 24-year-old women in Mauritius had at least some schooling, whereas the previous generation, 35- to 44-year-old women, were only half as likely to have attended school.¹⁸ This means the share of women with a basic education had doubled within 20 years. And in Mauritius, too, women did not just attend primary school: whereas in 1970 only 24 percent of girls attended secondary school, ten years later the figure had risen to 52 percent.¹⁹ By the 1980s Mauritius had already become the second-best educated African nation after South Africa.

Thus the foundations had been laid for economic progress: in 1976 average per capita income (including that of the wealthy sugar barons) was just US\$ two a day, or US\$ 779 a year. Initially, this rose only gradually to US\$ 1,063 a year by 1985. But once the better-educated cohorts entered employment, the economy started

17 Enzyklika Seiner Heiligkeit Paul PP. VI.: *Humanae Vitae*: Über die Weitergabe des Lebens, http://www.vatican.va/holy_father/paul_vi/encyclicals/documents/hf_p-vi_enc_25071968_humanae-vitae_ge.html

18 Xenos, C. (1977): *Fertility change in Mauritius and the impact of the family planning programmes*. Port Louis, Mauritius: Ministry of Health, Family Planning, Maternal & Child Health Services.

19 Lutz, W., and Toth, F.L. (Ed.) (1991): *Population, Economy, and Environment in Mauritius*. IIASA Collaborative Paper CP-91-01. Laxenburg: International Institute for Applied Systems Analysis.

to boom: by 1988 annual per capita income had doubled to US\$ 2,000. In 1994 it already exceeded US\$ 3,000 and in 2013 it reached US\$ 9,200 dollars. The average income of a Mauritian had thus increased by a factor of nine in less than 30 years. Mauritius is today one of the wealthiest countries in Africa – surpassed only by the tiny tourist island of the Seychelles and the oil-rich countries of Gabon and Equatorial Guinea, both with small populations. Although oil sales raised average incomes there, most people still live in poverty.

The rapid economic ascent of a country which had until recently served as a textbook example of the poverty trap to become a star among developing countries was economically underpinned by a steady rise in exports of ever higher quality. While back in the 1970s the country was still almost exclusively dependent on sugar cane exports, in the 1980s it branched out into the textiles sector and quickly progressed from a mass producer to a supplier of high-quality clothing. Because women in Mauritius were having fewer children by then, they were able to benefit from the new jobs in textiles and contribute to the family income. Today, highly priced textiles are still an important export, with made-to-measure clothing being flown into boutiques in Paris and London a day after orders are received.

In the late 1980s Mauritius discovered its natural assets – the tropical beaches, coral reefs and lagoons – and began to expand its tourist industry. The blossoming tourist industry was able to prevent, just in time, the heavy-metal contaminated waste water from its textiles factories permanently destroying the underwater world off its coasts. Mauritius took a conscious decision to promote up-market tourism and initially would not allow chartered planes to land on the island. Today, most of its tourist accommodation is in four- or five-star hotels where well-educated and multilingual employees provide a high level of service.

Meanwhile, IT and communications technology as well as the financial sector have started to play an important role in Mauritius's economy. By 2012 the 1.3 million Mauritians already had almost 1.5 million mobile phones.²⁰ International call centres serve not only the English- and French-speaking world but also China and India, because many Mauritians speak Mandarin or Hindi. Indian and Chinese IT companies outsource software development to what has become a self-declared “cyber island”.²¹ More than 18,000 people work in the IT sector – more than in

20 Dirooven, V. (2013): Overview of the ICT Sector and Software Industry in Mauritius, National Computer Board, <http://www.ncb.mu/English/Documents/News/World%20IP%20Day%202013/session%201/Overview%20ICT%20Sector%202013.pdf>

21 Cave, K. (2013): Market Analysis: Mauritius: The IT Island Paradise. IDG Connect, <http://www.idgconnect.com/abstract/3270/mauritius-the-it-island-paradise>

the financial sector, which employs 13,000 people.²² Twenty-one banks have their headquarters or a branch in the capital, Port Louis. With its stable and investment-friendly government, Mauritius is on the way towards becoming Africa's most important financial centre.²³ Sugar now accounts for only 15 percent of Mauritian exports, although sugar cane still grows on 90 percent of the agriculturally viable land.

Not only in industry and in the services sector but also in administration the Mauritians have achieved top marks: in the 2015 Ease of Doing Business Report, in which the World Bank assesses 189 countries in terms of how easy it is to found companies, conclude contracts, receive planning permission, obtain a reliable electricity supply or engage in trade, Mauritius occupied 28th place – ahead of Japan, Spain and France and far ahead of all other African states.²⁴ In addition, according to the index of the organisation Freedom House in Washington, Mauritius is the most democratic country in Africa and also has a high global ranking in this respect.²⁵

The progress of Mauritius is also evident from all other indicators for human development: average life expectancy is now 74, compared with 59 for Africa as a whole. Twelve children per 1,000 die before their fifth birthday, whereas the average for Africa is 62.

How has Mauritius managed within only four decades to turn itself from Titmus's "hell on earth" into an African success story – the "paradise on earth" advertised by travel agencies? This surely cannot be the result only of its investment- and export-friendly economic policy. In a report by the International Monetary Fund (IMF) entitled "Who can explain the Mauritian Miracle?" (published in 2001), the authors speculated about what the real reasons for the development were, since neither foreign direct investment nor an open trade policy could provide a convincing explanation for the miracle. The study came to the conclusion that there must be other "institutional" factors,²⁶ yet the word "education" is not mentioned once in the IMF report.

22 African Economic Outlook, <http://www.africaneconomicoutlook.org/en/countries/southern-africa/mauritius/>

23 Barry, H. (2014): Mauritius: Africa's next financial services hub? Moneyweb, <http://www.moneyweb.co.za/moneyweb-financial/mauritius-africas-next-financial-services-hub>

24 World Bank (2016): Doing Business 2016: Measuring Regulatory Quality and Efficiency. Washington D. C.: IBRD. <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB15-Chapters/DB15-Report-Overview.pdf>

25 Freedom House, Mauritius, <https://freedomhouse.org/report/freedom-world/2014/mauritius-0#.VIV0asnIckI>

26 Subramanian, A. and Roy, D. (2001): Who can explain the Mauritius miracle: Maede, Romer, Sachs, or Rodrik? IMF Working Paper WP/01/116. Washington, D.C.: International Monetary Fund, <https://www.imf.org/external/pubs/cat/longres.aspx?sk=15215.0>

Religion at any rate seems not to have played a key role in development, since the Mauritians have risen out of poverty without a Protestant ethic or a Reformation background. Rather, it is the broad educational approach espoused by Martin Luther that prepared the way for success. Mauritius adopted this concept from the British and adapted it to local conditions, thus achieving a similar outcome to that of the countries that had been directly influenced by the Reformation long before. But Mauritius is only one example of a pragmatic development strategy in which education has a central role to play. Everywhere in the world where development has dramatically improved living conditions within a few decades, education was part of the equation.

Asia – a latecomer to the knowledge society

A number of Asian states provide excellent illustrations of how the Reformation concept of a broad education can be copied without a religious background and implemented in parts of the world facing much greater challenges than small countries such as Finland, Singapore or Mauritius. After the Second World War Asia already had a population of 1.4 billion, more than half of the 2.5 billion global inhabitants at that time. Population density was considerably higher than on other continents and sustained rapid population growth had put Asia in a much worse position than Latin America or even some parts of the still sparsely populated continent of Africa, where living standards, particularly in the well-run British colonies, were comparatively high.

Living conditions in Asia, on the other hand, were miserable. The low level of development was reflected especially in low life expectancy: just 36 in India in the early 1950s, 45 in China and 48 in Korea. By contrast, in Brazil people could expect to live to the age of 51, in Costa Rica to 57 and in Argentina to 63.²⁷ Life expectancy is a good encompassing indicator of the social and economic development of a country, because it reflects many different aspects of people's lives: health, quality of nutrition, employment conditions and social cohesion.

Thus, in the 1950s the inhabitants of much of Asia could expect to live as long as the Europeans in Martin Luther's time. In the following decades the Confucian-influenced countries of East Asia in particular embarked on a course that condensed 500 years of European development history into between 50 and 100 years.

27 United Nations (2012): *World Population Prospects: The 2012 Revision*. <http://esa.un.org/wpp/documentation/publications.htm>

Japan – Luther meets Confucius

As described in Chapter 2, education was highly valued in the Confucian tradition. Yet for two and a half millennia it was limited to a small elite. Only with the arrival of British colonial power in the Far East and the end of the feudal structures in the first half of the 20th century did the Confucian elites in China, Japan, Korea, Taiwan and Vietnam come into contact with the Reformationist approach to education. The communist ideology imported from Europe of empowering the masses had a major impact, particularly in China. The elites of East Asia were impressed by the clearly visible economic and technological progress in Europe and the United States. It appeared as if Confucius and Luther could complement each other perfectly.

The pioneer of this development in East Asia was Japan. Both Buddhism and Confucianism together with Chinese characters had arrived in Japan from China between the 6th and 9th centuries and continued to evolve after being adapted to local conditions. But because Japan had for long stretches of its history deliberately isolated itself from the rest of the world, the feudal state had remained in a kind of socio-cultural hibernation and lost touch with the rest of the world. When this isolation ended in the mid-19th century, Japan found itself surrounded by the hostile powers Russia, the United States and Great Britain, all of which were seeking access to Japanese markets.

Finding itself in dire straits, the country decided it was time to open up after all. With the Meiji restoration under Emperor Mutsuhito (1852-1912), Japan underwent a series of comprehensive political and social reforms, and imported industrialisation and a modern political philosophy. Between 1871 and 1873, Japan sent missions to Europe and North America in order to learn from the obvious successes of the Western world, from its technological development and its education systems. Here Germany often served as a model. Indeed, Japan adopted not only large parts of Germany's Civil Code but also elements of the German education system.

Following the European example, Japan introduced compulsory schooling and established a state-organised school system all over the country. Having initially imported textbooks from the West, it soon replaced them with its own books based on the Confucianist ethic. By 1900 around 90 percent of all children in Japan were attending primary school. In addition, numerous European missionary schools opened specialising in secondary education; these were the only schools that offered girls equal educational opportunities. More than 3,000 Western teachers were brought into the country to teach modern science, mathematics and technology.

The expansion of education was followed by the industrial revolution. Soon the textiles industry was booming, not only to cover domestic demand but also for export. Very quickly, cheap Japanese products began to compete with British ones

in China and India. The early 20th century saw the development of heavy industry, increasingly in order to arm the military. Japan's military superiority enabled it to conquer Taiwan, Korea and large parts of northern China and to secure raw materials there. By the beginning of the Second World War Japan had grown to become the only global power in Asia. But like Germany, Japan's imperialist ambitions spelled disaster and the country ended the war in ruins.

After the war Japan pulled out all the stops to revive itself as an industrial nation. The government introduced trade barriers to shut out foreign competition and appropriated key technologies from abroad, importing tried and tested knowledge. Whereas the first products – cameras, transistor radios, motorcycles, cars – were still cheap imitations of Western models, Japan was soon manufacturing products of superior quality that were still cheaper than their Western counterparts. In the 1960s the Japanese economy was growing at an average of 10 percent annually.

With just under 3 percent of the world's population, Japan had already risen by 1968 to become the world's second economic power, behind the United States but ahead of Germany. It did not lose this status to China with its 1 billion inhabitants until 2010.²⁸ Per capita income rose from US\$ 5,200 in 1970 to US\$ 9,300 in 1980 and by 1990 had reached US\$ 25,100. Since the 1980s the Japanese government has supported the country's economic progress with the Technopolis Concept, investing heavily in research and development. The development of "Japan PLC" was steered by the Ministry for International Trade and Industry (Miti), which controlled cooperation between technology parks, universities and private companies down to the smallest detail. As Japan became a leader in one area of technology after another, building the safest cars, the most sophisticated robots, the longest suspension bridges and the fastest trains, Miti gained the reputation of a miracle agency in the West. This was the era of Japanese companies such as Sony, Toyota, Panasonic, Mitsubishi, JVC, Nintendo, Toshiba and Nikon, all of which became global leaders in technology.

The boom was driven by a well-educated working population that had been growing for almost half a century – by a total of 37 million people. But in 1990 the Japanese economic miracle came to an abrupt end after a major stock market and real estate bubble had burst: growth rates plummeted almost to zero, companies lost their competitiveness and state debt reached international record levels. At the same time the Japanese population aged at a rate unparalleled in the rest of the world.

28 Klingholz, R. and Vogt, G. (2013): *Demografisches Neuland. Schneller noch als Deutschland muss Japan Antworten auf eine schrumpfende und alternde Gesellschaft finden*. Berlin-Institut für Bevölkerung und Entwicklung. Berlin: Berlin Institute.

A quarter of Japanese people are now older than 65 and by 2025 people over 74 are likely to make up 18 percent of the population.

Yet for the moment Japan is still holding onto its position as the world's third-strongest economy and is helped in this endeavour by its human capital in the form of a highly qualified population. Good education is one reason why around 30 percent of Japanese men over the age of 64 are still working.²⁹ As everywhere else in the world, it is mainly the better qualified people who are able to – and want to – go on working and remain productive. In a survey 31 percent of Japanese male respondents said the ideal age to retire was 70; 11 percent even thought people should go on working until the age of 75.³⁰ Japan is thus a test case of how a broad educational basis can cushion the effects of an aging population, which will not only affect all industrialised nations in future, but will soon start to be felt in the first emerging countries as well.

China – a late developer

Until the 15th century China, the birth place of Confucianism, influenced the world of reading and writing with inventions ranging from paper to printing. Moreover, for many millennia China had considered itself to be the centre of the world, and indeed, *Zhongguo*, the Chinese word for China, means Middle Kingdom. Yet seen from today's perspective, the country with its 1.4 billion people, the world's most populous over many millennia, has in fact been a late developer. When the People's Republic was founded on 1 October 1949, following the Second World War and the civil war, China was one of the world's poorest states and an estimated 80 percent of the population were illiterate.

After the victory of communism, Mao Zedong (1893-1976), the first chairman of China's central government of the people, had a major goal: to modernise and industrialise the country along the lines of the Soviet model and with Soviet support.

As in all communist experiments in history, achieving universal literacy was one of the most important goals in China that aimed to give legitimacy to the revolution. This idea goes back to Karl Marx, whose father, Heinrich, had converted from the Jewish to the Lutheran faith and had grown up in Prussia in a strongly Protestant environment. Free education for all was an integral part of the class struggle and a key instrument for the liberation of workers and peasants. Yet Mao's obsession with a revolutionary planned economy and, above all, the Cultural Revolution, dealt severe blows to education. On the one hand, the literacy campaign meant

29 OECD (2015): Online Database. Paris. <http://stats.oecd.org/>

30 Williamson, J.B. and Higo, M. (2007): *Older Workers: Lessons from Japan*. Boston College Center for Retirement Research. http://crr.bc.edu/wp-content/uploads/2007/06/wob_11.pdf

that by 1970 around 90 percent of men and 80 percent of women under the age of 25 had attended primary school.³¹ But the brutal attacks by Mao's Red Guards on anything that looked like being intellectual and the closure of nearly all universities as "outgrowths of the bourgeoisie" meant that the middle-class education elites – in other words, the top of the "education pyramid" – were practically eradicated.

Because the newly literate children of the workers and peasants were not yet in a position to have an economic impact, Mao's development programme turned out to be disastrous overall. The experiments of the planned economy produced the greatest famine disaster in human history, claiming an estimated 36 million lives, while altogether 77 million people lost their lives to erroneous planning and state terror.³² After 27 years in power Chairman Mao left behind a desperately poor, underdeveloped country in which the most able people were either dead or neutralised.³³ China had experienced almost no tangible development under Mao. In 1970 the 814 million Chinese had an average per capita income of US\$ 0.31 a day which, according to any criteria, was well below the absolute poverty line. The fertility rate was almost six children per woman. Around half the population had never attended school, although the younger generations were much more literate than the older ones. The omissions of the past continue to be felt in the present: even today around 80 percent of women and 40 percent of men over the age of 75 are illiterate.³⁴

Only after the Mao era had come to an end was China really able to reform. The person responsible for this had been ostracised by the communist party for a long time. His name was Deng Xiaoping. Once a staunch ideologist and comrade of Mao, he had in the course of his career repeatedly been deprived of power and silenced, but never disappeared completely. Although Deng himself had never held high political office, he rose soon after Mao's death to become China's chief strategist. In 1978, at the age of 74, he visited the city-state of Singapore, with its ethnic Chinese majority, in search of a model for economic reform that would raise the living standards of the general population. He returned deeply impressed by the achievements of Prime Minister Lee Kuan Yew, 19 years his junior.

31 Lutz, W., and KC, S. (2011): Global Human Capital: Integration Education and Population. *Science* 333(6042): 587-592.

32 Jisheng, Y. (2012): *Grabstein – Mübei: Die große chinesische Hungerkatastrophe 1958-1962*. Frankfurt/M: S. Fischer.

33 Rummel, R.J. (2007). *China's Bloody Century: Genocide and Mass Murder since 1900*. Piscataway NJ: Transaction.

34 Rand Corporation (2015): China's aging population poses challenges, but policy changes can help. <http://www.rand.org/news/press/2015/01/19.html>

It was Deng's aim "to adopt and improve on" Singapore's experience. He liberated the peasants from the yoke of the state-planned economy, allowed initially small private companies to be founded and established the first special economic zones on the coast, where in a still socialist country the Chinese were allowed to experiment with capitalism. He sent tens of thousands of Chinese to be educated in Singapore and focused his policy of renewal on the fields of education, science and technology. The academies and universities, closed since the Cultural Revolution, were able to resume teaching and research, and those academics that had survived the terror of the Red Guards were reinstated.

For Deng education was a key to development. Here his Confucian values overlapped with the official communist ideology and with his goal of emulating Singapore's economic success. In May 1985 the Central Committee of the Chinese Communist Party decided to institute education reforms which laid the foundations for the present system. From the age of 6 children are required to attend school for nine years. Six years of primary school are followed by another three in the lower secondary school. Young people then have the option of attending secondary school for another three years and going on to university. Here China has stepped up its efforts in recent years to expand the technical and scientific disciplines.

In 1980, parallel to political and economic reforms, China introduced the one-child policy. Despite the ravages of the Cultural Revolution, the Chinese population had grown from 650 to 840 million between 1957 and 1971. The Chinese population was increasing by 1 million every two and a half weeks, and it had become clear that if growth continued unchecked, there would be a danger of famine. Although home to 25 percent of the world's population, China had only 7 percent of global agrarian areas. Under the slogan "*wan, xi, shao*" (later, longer, fewer), the government launched a birth control campaign. People were encouraged to marry later, to leave bigger gaps between children and to have fewer offspring.

These measures, for which there were clear planning targets, could not be realised without pressure. Those who violated the norms could expect harsh penalties. And, indeed, the fertility rate halved within a decade from almost 6 to 3 children per woman. But because the much higher birth rate in the past meant that the Chinese were still very young on average, population growth continued unabated and China crossed the 1 billion threshold in 1980. Back then both Chinese researchers and their Western colleagues warned of a "population explosion", predicting a Chinese population of 4 billion by the year 2075, if growth continued at the same rate.³⁵

35 Greenhalgh, S. (2008): *Just One Child: Science and Policy in Deng's China*. Berkeley: University of California Press.

Therefore, in 1980, Deng Xiaoping, who himself had four children, prescribed a one-child policy, which could be enforced – particularly in the countryside – only through rigorous measures and human rights violations. The result has been a 1.5 children policy. First of all, it has not proved possible to control reproduction in the remotest corners of the country and, second, there have always been exceptions, such as for ethnic minorities or for couples whose first child was a girl. Today, social development has reached a point where, at least in the big cities, 80 percent of people only want one child in any case.³⁶

Ultimately, it was the combination of falling birth rates, the rapid increase in the education of young people and the establishment of labour-intensive industries that gave China's economic boom its legendary dynamic. Like all successful developing and emerging countries, China was able to benefit from its so-called demographic dividend.³⁷ This emerges when the population structure of a country changes fundamentally: as soon as birth rates fall in a poor country, the proportion of 15- to 64-year-olds, in other words those available for gainful employment, automatically grows. If in this phase of development – when there are ever fewer children and still not too many older people to be taken care of – a country manages to provide sufficient jobs for the disproportionately large share of people of working age, the engine of growth will be started.

Jobs will emerge mainly in the lower-tech sectors of industry, in textiles or in the manufacture of simple consumer goods. If the up-and-coming younger generations are offered a steadily improving standard of education, then the country in question can very quickly start to achieve ever higher levels of economic value in, say, the high-tech sector as in Singapore or Japan. In this way the demographic dividend increasingly becomes an education dividend.³⁸ All in all, it is estimated that around a third of economic growth in the boom phases experienced by the countries of East and Southeast Asia can be attributed to their making optimal use of their young and ever better qualified populations.³⁹

Between 1979 and 2011 the annual economic growth rates in China were around 10 percent. But since growth started from a very low base, it took many years for living standards to begin to reach those of the other emerging countries. Even in

36 Basten, S. et al. (2014): Future Fertility in low Fertility Countries. In: *World Population and Global Human Capital*, Lutz et al. (ed.), Oxford: Oxford University Press.

37 Bloom, D. et al. (2003): *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. Santa Monica: RAND Corporation.

38 Crespo Cuaresma, J. et al. (2014): Is the demographic dividend an education dividend? *Demography*, 51 (1): 299-315.

39 Mason, A. (2002): Capitalizing on the demographic dividend. <http://www2.hawaii.edu/~amason/Research/UNFPA.Pdf>

1992 average annual per capita income in China was US\$ 363, so it had not even reached the threshold of one dollar a day. Only in 2001 was the 1,000 dollar line crossed. This increased to 2,000 dollars in 2006. By 2013, according to estimates by the World Bank, annual per capita income in China, which by then had 1.4 billion inhabitants, had reached US\$ 6,800. No country on earth has ever managed to free so many people from poverty in such a short period. China's huge population means that it has long since pushed Japan into third place in terms of total size of the economy and is hot on the heels of the United States.

In China, as elsewhere, the expansion of education and economic progress were not religiously motivated but simply followed the Western model of mass education. Under Mao, religion played almost no role at all, because it was forcibly repressed. Today, on the other hand, 12 percent of Chinese describe themselves as "very religious" and another 19 percent say religion is "somehow important in their lives". In the 2000 census between 11 and 16 percent of the adult population said they were Buddhists, 4 percent said they were Christians (three-quarters of them Protestants) and 1.5 percent were Muslims.

On the basis of these data, Chinese researchers have tried to find out whether religious belief has an impact on economic development. A statistical analysis revealed that in provinces with a high percentage of Christians, economic growth was significantly higher. By contrast, Buddhism appeared to have no proven effect and Islam a slightly negative one.⁴⁰ The researchers concluded that in China the Protestant educational ideology has had a positive impact on economic development, as it had in Europe after the Reformation.

Jews and Roma: written and oral traditions

By now it should be abundantly clear that educating broad sectors of the population has played a major role in economic development, irrespective of whether the country concerned is a small island state or a country with over 1 billion inhabitants, such as China. As a final example we would like to show how the culture of education can also have a major impact on development among people who have never had, or who for a long time did not have, their own state.

From at least the late 14th century onwards two ethnic and linguistic minorities who had two things in common lived in Europe: they were distributed over many different countries and systematically discriminated against by the majority populations. They were the Jews and the Roma. Both groups were regarded almost everywhere as aliens and were persecuted as alleged well-poisoners, arsonists or

⁴⁰ Wang, Q. and Lin, X. (2014): Does religious beliefs affect economic growth? Evidence from provincial-level panel data in China. *China Economic Review*, 31 (2014): 277-287.

parasites. In 1538 Bohemia and Moravia already had laws that allowed people to kill Roma men without incurring any kind of punishment. A number of cities in Germany and England referred to the Roma population as “Egyptians” and gave them the choice of leaving the country or risk death.

In Europe the systematic persecution of the Jews goes back even further. Wherever the plague broke out, the Jews were held to blame. In 1349 the citizens of Strasbourg killed around half the Jews living in the city, although the plague had not even broken out there.

The persecution of the Jews and the Roma is a recurring phenomenon throughout the history of Europe. Both groups were generally barred from owning productive land and were repeatedly driven out of the cities and whole swathes of territory, or else condemned to live in special ghettos. During the Holocaust the Jews and the Roma shared a similar fate, being the only two clearly defined ethnic groups that the Nazis sought to eradicate. More than half of all Roma living in Germany and Austria were murdered as “enemies of the people and the Reich of un-German blood”. It is estimated that around 500,000 Roma and around 6 million Jews fell victim to the racial fanaticism of the Nazis.⁴¹

Linguistic and genetic analyses have shown that the Roma originated in India. How and precisely when they came to Europe is unclear, however. What is certain is that they have lived in south-eastern Europe since at least the 14th century. Another group arrived in the 15th century via North Africa, crossing the Mediterranean to Spain. From these two secondary centres they spread throughout the entire continent as far afield as Finland, Norway and Scotland. Although the Roma see themselves as a community, they have no territory that they would call their “homeland”; unlike the Jews, they are not a diaspora.

The language of the Roma – Romani – has developed a number of different dialects influenced by the languages in the places where the Roma have lived, but it has always had an ethnic identity-conferring function. Some Roma groups try to keep their language secret from non-Roma as a way of protecting themselves. Until the 20th century Romani scarcely existed as a written language.

The Roma thus never had their own writing from which to learn. This explains one of the Roma’s main problems today, namely their very low average level of education. It means that they are barred from decently paid work and many of them subsist under pitiful conditions. In many countries the Roma still have no opportunity to go to school, making it very difficult for them to advance socially. The estimated 9 million

41 Dokumentations- und Kulturzentrum Deutscher Sinti und Roma: Der nationalsozialistische Völkermord an den Sinti und Roma, <http://www.sintiundroma.de/sinti-roma/ns-voelkermord.html>

Roma in the European Union are considered by far the most socially disadvantaged ethnic group. They form a population the size of Austria's but have no country of their own. They are dispersed all over the Continent and are at the lower end of the poverty scale in all countries.⁴²

People of the Book

The social and economic development of the Jewish minority in Europe could not have been more different from that of the Roma. The Jews have always regarded themselves as descendants of the Israelites who, according to the tradition of the Torah, were led by Moses after their exodus from Egypt to freedom in Canaan (in what is now Syria). This gave them a clear identity and, unlike the Roma, a history that was well documented in numerous historical and biblical sources.

What is certain is that Israelite tribes settled in the region of Palestine around 1250 BC and that they founded an independent kingdom with Jerusalem as its capital around 1000 BC. When the Kingdom of Judah was conquered by the Babylonian King Nebuchadnezzar II in 597 BC and some of the Israelites were forcibly taken to Babylon, the Jewish Diaspora evolved. After the Romans had formed the Roman Province of Judea out of the Jewish areas of settlement around the time of Christ's birth, destroyed the temple in Jerusalem in 70 AD and put down the last rebellion in 132-135 AD, most of the Jews became dispersed throughout the Roman Empire. Practically everywhere the Jews managed to retain their religion, language and writing.

Education had already had a central function in ancient Israel, not least because the Jewish religion is strongly determined by scriptures and it was considered desirable that all Jews should be able to study those texts themselves. Traditionally, education among the Jews was primarily the task of the father. Under the High Priest Joshua ben Gamla schools for children aged 6 and older were established in all towns and villages in 64 BC. No doubt only a small percentage of children really did learn to read and write, and therefore it is assumed that in Roman Palestine in the first few centuries AD, less than 5 percent of the population could write more than their names.⁴³

In the Jewish Diaspora of late Antiquity and the Middle Ages the Jews expanded their culture of education further. Particularly in the cities, it was taken for granted

42 Griening, G. (2010): Roma in Europa. Das Online-Handbuch Demografie des Berlin-Instituts. Berlin: Robert Bosch Stiftung. <http://www.berlin-institut.org/online-handbuchdemografie/bevoelkerungsdynamik/regionale-dynamik/roma-in-europa.html>

43 Bar-Ilan, M. (1992): Illiteracy in the Land of Israel in the First Centuries C.E. In Ishbane, S. et al. (ed.), *Essays in the Social, Scientific Study of Judaism and Jewish Society*, II, New York: Ktav, pp. 46-61.

that young men from the Jewish middle classes would learn to read, write and do arithmetic. The Jews' success as merchants and later in the financial sphere was closely linked with their higher level of education. Despite repeated pogroms, persecution and discrimination, the Jews achieved prominence time and again in the fields of science, culture and economics. The *Haskala*, the epoch of Jewish Enlightenment, whose most important representative in Germany was Moses Mendelssohn (1729-1786), had a special role to play. The Jewish contribution to European culture reached its heyday in Vienna and Berlin in the late 19th and early 20th centuries – that is, on the eve of the terrible extermination of the Jews in the Holocaust. In the period leading up to the Second World War Jewish scholars, literati and artists such as Albert Einstein, Sigmund Freud, Heinrich Heine, Theodor W. Adorno and Paul Klee formed an important part of the European educational and cultural elite.

Because the Jews in Europe were always a minority, there are few statistics about the education level of the Jewish population. Lists of pupils from individual secondary schools show that Jews were often strongly over-represented. How their abilities affected the economic development of the states in which they lived and worked can thus be quantified only indirectly: the mean income of Jews in Germany at the beginning of the 20th century was three times as high as that of German Christians. The United States certainly benefited enormously from the exodus of Jews from Nazi Germany as well as from the Soviet Union. Today the Jews have the highest average income of any group in the United States.⁴⁴ In global terms, people of Jewish origin make up 20 percent of all Nobel Prize winners, even though they form only 0.2 percent of the world population.

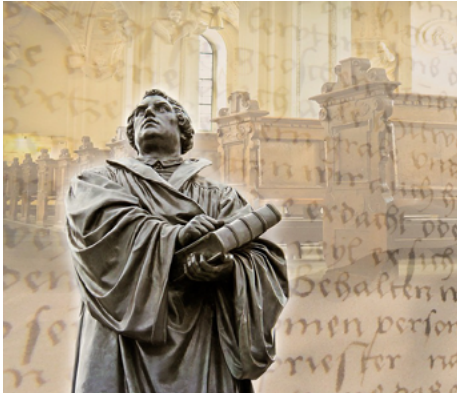
Ultimately, the emphasis placed by Jewish culture on education and scholarship can also be seen in modern Israel. Very early on the state pursued the goal of ensuring that sound quality of an international standard is delivered throughout the entire spectrum of scientific disciplines and built centres of excellence for research and technology. Compared with the total working population, Israel has by far the largest percentage of published authors in the fields of natural science, engineering, agriculture and medicine in the world.⁴⁵ The outcome of these education efforts is a per capita income that is on average higher than that in the European Union.

Our attempt here to compare the Jews and the Roma is problematic in many respects. The two cultures and the way in which they developed are simply too

44 Kohlhammer, S. (2006): Kulturelle Grundlagen wirtschaftlichen Erfolgs. *Merkur*, 11: 1025-1037. <http://www.eurozine.com/kulturelle-grundlagen-wirtschaftlichen-erfolgs/>

45 Einzigartiges Israel: Wissenschaft, <http://www.einzigartiges-israel.de/html/164-wissenschaft.html>

different. Nevertheless, one main difference lies in how they approached written traditions. In the case of the Jews, this approach conferred identity and required literacy. In the case of the Roma, this dimension was lacking altogether. Whereas the former, despite all setbacks and disasters, proved capable of enormous academic achievements, the latter remained socially and economically marginalised owing to the complete lack of a written language. Writing and literacy sent these two peoples down utterly divergent paths of development.



4

ON THE LOSING SIDE

Is Islam an obstacle to development?

In the mid-15th century two things happened at opposite ends of Europe that seemingly had nothing to do with each other: as described in the previous chapters, Johannes Gutenberg, a goldsmith from Mainz working in the far western part of the Continent, developed a machine with movable type – the printing press – and thereby created the first “new” medium of the second millennium. The printing of books helped spread the Reformation and opened the way for the literacy of the masses. This laid the foundation for today’s information and knowledge society. Gutenberg’s invention was probably the most important innovation of the modern era.

At the same time – more precisely, in the late spring of 1453 – at the far eastern end of the European Continent, Constantinople, the capital of the Christian, eastern Roman Byzantine Empire fell to the Ottomans. For more than 1,000 years Constantinople, which later became Istanbul, had been capital of this empire and, at times, the richest and largest city in Europe. The Hagia Sofia, which for almost 1,000 years was Christianity’s largest church, could be found there. But in the

15th century Constantinople's heyday had long been over and the city was easy prey for attackers. Thus not only did the era of Greek Christian culture come to an end, but Christianity lost control over the Bosphorus, that important strait on the trade route to Asia – the so-called Silk Road. For the Ottomans, the conquering of Constantinople was the cornerstone for the further expansion of their empire, which reached right up to the gates of Vienna.

In the wake of the conquest a large number of Greek teachers and scholars fled from Constantinople to the West – above all, to Italy. On the eve of the Reformation, they formed the intellectual backbone of the emerging Renaissance and humanism – those scholarly currents whose mode of thinking harked back to Greek Antiquity. This upheaval in the Western Europe of the late Middle Ages, which also benefited the Reformation, led to the inexorable spread of knowledge. Gutenberg's printing technology was the most important instrument in that process.

Printing ban in the Islamic world

However, at the eastern end of the Continent – in the Ottoman Empire – exactly the opposite occurred: Islamic legal scholars refused to allow the printing press to become an integral part of society out of fear that a second book could appear alongside the Koran. Instead, considerable value was placed upon the oral transmission of knowledge, even though only a small number of people had a good enough memory for this. It was thought that passing on knowledge by word of mouth would leave less room for arbitrary interpretation and would therefore be more authentic.

In 1485 – some 30 years after Gutenberg's invention and 30 years before the Reformation – the mechanical reproduction of texts in Arabic type was prohibited by the Ottoman Sultan Bayezid II under threat of the death penalty. In Europe at the beginning of the 16th century several million books had already been printed – and were increasingly covering secular topics as well – but the art of printing remained an absolute taboo in the Islamic world for almost 300 years.

Knowledge as a public asset that can be disseminated beyond all borders, education as a democratic instrument wrested away from the elite – both were denied to the Islamic world – as well as the possibility of forming one's own judgement from that which had been read. The ban lasted not only while the Renaissance, humanism and the Reformation ran their course but also as the way was being paved for the Enlightenment and the Industrial Revolution. Consequently, the education revolution triggered by the art of printing passed the Islamic world by altogether.

In the Arab-inhabited parts of the world reading and writing continued to be the preserve of the (religious) elite. Ordinary people were only able to hear what the

scholars considered worthy of being communicated, and the latter were determined to keep it that way. Their argument was that even God had spoken – not written – to mankind. The Koran was to be preserved and disseminated, but only through handwritten texts.¹ Any other books would only confuse believers.

Earlier, the Papal Church had used the same arguments against the printed Bible intended for ordinary people. In Europe even humanists such as Erasmus of Rotterdam had not wanted to popularise God’s word, preferring to maintain a monopoly on knowledge.² Knowledge inevitably meant power, which is why the powerful mostly did their utmost to prevent it from being spread among the people in an uncontrolled way

From this point of view, Europe’s printing presses, which were churning out texts in ever larger numbers, constituted a veritable profanity. What had changed in comparison with the pre-printing age was not only the extent of the spread of knowledge but, above all, the speed: the contemplative and slow copying of texts with quill and ink was replaced by a “flurry of printing”. The modern era, with its steadily accelerating pace of life, began with the printed word. The voices warning against this acceleration can be heard to this day – except for today, it is the Internet that is suspected of promoting the demise of the culture of books. What is beyond doubt is that while the art of printing had clear advantages, it also brought considerable disadvantages for certain groups. As noted by the Middle East expert and historian Dan Diner, who teaches in Israel and Germany, it became the “Trojan horse of the modern era”.³

But why did the industrial printing press remain a taboo for so long in the Arab world, which, for its part, was founded on a highly developed culture of writing? First, just as in the Christian world, the fear of the uncontrolled spread of knowledge was definitely a factor. Second, in all likelihood professional copyists unleashed a storm of protest against the printing machines. Third, a printing ban was much easier to enforce in the relatively homogeneous Turkish-Arab world of the 15th century than in Europe, with its countless princedoms that were frequently at loggerheads with one another. And fourth, the Arab public was disturbed by the type aesthetic implicit in the industrially printed work, which could not compete with the artistic, calligraphic manuscript of the scribes. And so it happened that the Muslims willingly went along with the enforced taboo. They were not interested

1 Schoeler, G. (1989): Mündliche Thora und Hadit: Überlieferung, Schreibverbot, Redaktion. *Der Islam* 66 (2): 213-251.

2 Schilling, H. (2012): *Martin Luther. Rebell in einer Zeit des Umbruchs: Eine Biographie*. München: C.H. Beck, p. 174.

3 Diner, D. (2009): *Lost in the Sacred: Why the Muslim World Stood Still*. Princeton: Princeton University Press.

in the books of Arabic philosophers published in Italy during the 16th century.⁴ In general, they showed little interest in the printed word, which was readily available in their immediate environment. This was because in the Arab world the printing ban did not apply to Christians or Jews, with whom the Muslims lived peacefully together in many parts of the Ottoman Empire. Both groups made frequent use of the new technology. Only in the case of the Jews was it forbidden (as it is to this day) to reproduce by mechanical means the five Books of Moses – namely, the Torah – which had originally been written on parchment.

When Sultan Ahmed III allowed books to be printed in the Ottoman Empire for the first time in 1727, albeit under the strict control of the scribes and with the exception of the Koran and other sacred texts, there was almost no impact: the public showed little interest in the books and the first printing press in Istanbul had to close within 20 years owing to insufficient demand. It had published all of 17 titles in small print runs. By this time, at the other end of Europe, England's Thomas Newcomen had long invented the steam engine, which was later perfected by James Watt and became the symbol of the Industrial Revolution. The once powerful Ottoman Empire lagged further and further behind and eventually became the "sick man of Europe".

The year 1828 witnessed the first-ever Koran to be reproduced by Muslims with the help of technology; however, the technical procedure used was lithography, which gives the impression of handwriting. To this day the Koran is printed not by movable type but rather by lithographical or photomechanical means only. Not until 1798 did an actual printing press begin operating in Egypt – during the three-year French campaign at the time of Napoleon Bonaparte. But a furious crowd destroyed the workshops. The first state printing press emerged in 1822 on the outskirts of Cairo.⁵ By this time the "Physical Society" had already been founded in Frankfurt am Main on the initiative of Johann Wolfgang von Goethe; the association was intended to complement Senckenberg's Society of Naturalists and to make the new scientific findings widely known among the middle classes. While the Arab world was still preoccupied with censorship rules some 400 years after the invention of the printing press, Europe had already entered the age of the early knowledge society.⁶

4 Diner, D. (2009): *Lost in the Sacred: Why the Muslim World Stood Still*. Princeton: Princeton University Press.

5 Ibid.

6 Atiyeh, G.N. (Ed.) (1995): *The Book in the Islamic World*. Albany: Suny Press.

The golden age of Islam

Entering the search terms “science” and “Arab world” will inevitably take one back to an epoch that lies some 1,000 years in the past. From the 9th to the 13th centuries Arab knowledge and achievements pioneered the advancement of science – specifically, in the fields of algebra, philosophy, physics, alchemy, astronomy and medicine. Arab scholars were far ahead of their counterparts in Christian Europe. At that time all of ancient Greek and much of Persian learning was translated into Arabic and further developed in the process. The Arabs proudly referred to the Greeks as their “forefathers”. Science valued practical issues more highly than philosophical ones – for example, questions related to engineering and architecture or irrigation techniques. Mosques used the findings from astronomy and trigonometry to determine, in a wholly pragmatic fashion, the direction of Mecca so that people could face it when praying, or precisely when Ramadan began. The famous physician, philosopher and alchemist Abu Bakr Mohammad ibn Zakariya al-Razi, known as Rhazes, ran two hospitals in Baghdad, was the first to identify the infectious diseases smallpox and measles, discovered that fever is a natural defence mechanism of the body and wrote a 23-volume medical encyclopaedia, among other works.

With its single language and religion, the Arab Empire covered an area that extended from the capital, Baghdad, via Damascus and Cairo to the southern Spanish city of Cordoba as well as into parts of India, Persia and China. In this empire scientists of different religious faiths and ethnic origins were able to realise their potential in one of the first cosmopolitan societies. While it is true that Christians and Jews had fewer rights than did Muslims, they were both respected and needed, not least because they had to pay higher taxes. It is thought that the Arabs became acquainted in China with the production of paper, which promoted both the dissemination of (handwritten) books and literacy.⁷ The Arabs were ahead of the Europeans not only in the spice and precious metal trade but also in the crafts of that time, in the production of rugs and textiles. Even the separation of church and state, which would later give the European nations a significant jolt forward in their development, had already been envisaged in this epoch: in Cordoba the Arab physician and philosopher Ibn Rushd (1126-1198), who was also known as Averroes, wrote about the “double truth” because science could not explain revelation and revelation did not speak the rational language of science.⁸ This was the golden age of Islam.

7 Ofek, H. (2011): Why the Arabic World Turned Away from Science. *The New Atlantis*, 30: 3-23.

8 Abdel-Sabad, H. (2010): *Der Untergang der islamischen Welt*. München: Droemer.

Stagnation and decline

From the 11th century onwards the significance of Arab culture declined and the empire began to fall apart. In 1258 the Mongols overran, ransacked and then burned down the once flourishing million-strong metropolis of Baghdad, carrying off the most talented craftsmen to Central Asia. Just like the terrorists of “Islamic State” today – and moreover in the same place – the Asian army of horsemen destroyed libraries, mosques and hospitals and massacred large parts of the population. Education ceased to be valued and the schools of that time struck the classical disciplines of mathematics, philosophy and medicine from the curriculum and began to teach only religion. Thus began the decline of Islam.

The Ottoman Empire – which in certain respects had assumed the mantle of the Arab Empire and which, having expanded to Asia Minor and the Middle East, gained a higher profile through the conquest of Constantinople in 1453 – could not begin to fill the vacuum left by this decline. The Ottomans were more interested in traditional structures than in what was new. Neither Christopher Columbus’s discovery of America in 1492 nor the shifts in fiscal power that resulted from the enormous amounts of gold and silver found in America could influence the Ottomans’ view of the world. After Portugal’s Vasco da Gama had discovered the maritime route to India in 1489 via the Cape of Good Hope, at the southern tip of Africa, the monopoly of Arab traders was broken and relations between the European centres and the Arab world became increasingly unimportant. Despite the loss of numerous ships, the maritime route was significantly more advantageous for the Europeans than was the land route, which traversed unsafe terrain and, from start to finish, involved paying incalculable duties and taxes. The centrally controlled Ottoman Empire – the last Islamic imperium in history – slept right through the dawning of the modern era.

Indeed, the education of broad segments of the population, especially in Arab countries, has not been accorded the importance that is necessary for the wellbeing of societies in the 21st century. These countries have failed to achieve what the states of East Asia and Latin America have achieved long since – closing the education gap with the “Western” world to join the ranks of emerging and industrial countries thanks to a well-qualified middle class and entrepreneurial freedom, and thereby to improve significantly the quality of life of their citizens. The peace and development generating effect of education, work and affluence has not yet run its course. Worse still, the countries that have paid too little attention to education are experiencing the most radical attacks against a democratic approach to education; as a result, what was once achieved is under threat of being lost again. In many places – for example, in Syria, Iraq, Libya and Yemen – where Islamist terror is spreading or despots remain in power, “lost generations” are growing up. They are suffering not only because

of despotism and civil wars, but also because of their governments' lack of interest in education; some will be sent out into the world without ever having attended school or obtained any training. These young people form the basis of a growing body of discontented youth who have virtually no chance of regular employment and can easily be radicalised. The American political scientist Aaron Segal from the University of Texas in El Paso describes development in these countries as a "history of frustration".⁹ That history threatens to further alienate the Arab world from successful social systems and intensify the clash of education cultures.

The Arab world: rich in oil, poor in opportunities

Today's Arab world stretches in one broad strip from the Sultanate of Oman on the Indian Ocean, one of the richest nations of the world, to the desperately poor Mauritania on the Atlantic; depending on what definition is used, it covers some 24 states. While oil and natural gas have enabled few Arab countries to enjoy considerable prosperity and allow their citizens a high standard of living, significant poverty and a dangerous shortage of energy, drinking water and food prevail in large parts of the Arab world.¹⁰ Owing to widespread developmental backwardness and the poor economic situation, the Arab countries, in which almost 20 percent of the world's population can be found, account for just 6 percent of global income – despite oil and gas revenues in the billions. Above all, in terms of education indicators, these states are lagging behind those emerging countries in East Asia and Latin America that are blessed with fewer natural resources. Thus the Arab world is "richer than it is developed", according to a report by the United Nations.¹¹ Most important, it is poor as far as opportunities for young people are concerned.

Indeed, this is the case even if it is frequently overlooked in the public debate that the Arab world is by no means identical with the Islamic world. Only a quarter or so of all Muslims live in the Arab countries. The overwhelming majority of people of the Islamic faith live in non-Arab states – in Indonesia (the largest Islamic state with a population of 260 million), Pakistan (the second largest with 200 million), Malaysia, India, Bangladesh, Iran or Turkey. In many parts of the Islamic world, development is proceeding very differently from what is happening in the Arab world: Indonesia and Malaysia number among the aspiring Asian tiger states, which are distinguished by a strong export industry, rapidly rising education levels and significantly lower birth rates – soon even Bangladesh will join their ranks. In terms

9 Segal, A. (1996): Why Does the Muslim World lag in Science? *Middle East Quarterly*, 3 (2): 61-70.

10 United Nations Educational, Scientific and Cultural Organisation (2010): UNESCO Science Report 2010. *The Current Status of Science around the World*. Paris: UNESCO publishing.

11 United Nations Development Programme (2002): *Arab Human Development Report. Creating Opportunities for Future Generations*. New York: United Nations Development Programme.

of many development indicators, Turkey and Iran, too, are more similar to the industrial countries than to the Arab world.

But why do the Arab countries perform so poorly in comparison with other Islamic states? This question has been posed repeatedly by the United Nations and has been the subject of several large-scale studies for many years. These reports are noteworthy for two reasons. First, they use objective data to analyse the dramatic state of development and education in the Arab world. And second, they are written by a team of Arabs who are high-ranking economists and social and cultural researchers, which means they are not disparagingly judgmental along Western lines. It is precisely for this reason, together with the objective and restrained tone of the UN, that the reports are so authentic and hard-hitting.

The crisis of the Arabic language

It is interesting that the authors of the *Arab Human Development Report* view Arabic as a major obstacle to development. The language of a society is *the* medium for development because it forges a link between people and their intellect. It enables them to perceive the surrounding world and subsequently to exchange ideas about reality. A knowledge society, in particular, is dependent on such a medium – one in which facts related to all disciplines, from nuclear physics to philosophy, can be recorded precisely in word and text, preserved and passed on. The internet has had the effect of significantly reinforcing, once again, the advantages of language and the written word in spreading knowledge.

Arabic is the native language of some 320 million people. But there are two versions of Arabic – on the one hand, classical High Arabic (Fusha) and, on the other, spoken Arabic. The former is the official and written language, which in practice is barely used in speech and which no one learns as their mother tongue. It is the language of the Koran and numerous religious tracts written during the period from the 7th to the 9th centuries. Only Arabs with a relatively high level of education have command of it, while the illiterates are unable to understand it. This means that they have no direct access to their holy scripture. High Arabic was frequently the literary language at the time of Mohammed and even earlier, and has barely changed since then. It endows the people with their identity, since it is deemed the medium of the word of God and serves to distinguish them from other societies.

What, in fact, passes the lips of people in daily speech are the numerous national and regional dialects to be found throughout the Arab world. The differences between the individual dialects are so strong that a Moroccan and an Iraqi can barely understand each other. The problem of this “diglossia” – the situation in which the bilingualism of a society is based on one and the same language – is that people speak differently from the way they write or read. Thus religious and political texts

as well as newspaper articles are written in High Arabic (the “authentic language”), while the man on the street and actors in feature films use colloquial language (the “corrupted language”) in one of the various dialects, for which there is seldom a written form.¹²

This means that new findings in the fields of technology and science would have to enter into the written language in order to be recorded and disseminated throughout the various countries of the Arabic-speaking world. This language, however, is too complex and antiquated for that purpose. Moreover, as the language of the Koran, it is “sacred” and must be protected from new influences and foreign words. Thus neither new specialist terms nor commonplace, albeit possibly important everyday experiences – that is, elements of the modern era – enter the high form of the language. High Arabic is wholly unsuitable for use in modern science and technology; as the historian Dan Diner writes, it “prevents knowledge from being processed in an appropriate manner and integrated into the canon of society”.¹³ The Arab Human Development Report adds that the Arabic language is facing a crisis because it stymies theorisation based on facts, is unsuited to creating and documenting knowledge and thus impedes the “Arabisation of science”.¹⁴ Consequently, the report calls for “language engineering” – that is, a thorough reform of the Arabic language to make it fit for the 21st century. Five hundred years ago Martin Luther achieved something similar with the German language when he created the basis of communication for all German-speaking people through his translation of the Bible into East Middle German. With relatively few adjustments, this language evolved into what is today’s High German.

The linguist Mohamed Maamouri from the University of Pennsylvania, USA, believes that the Arabic diglossia is at least partly responsible for the poor educational results in Arab countries.¹⁵ Without doubt, it hinders the ability to think in abstract terms, which comes with literacy, and thereby impedes the spread of knowledge.

12 Maamouri, M. (1989): Language Education and Human Development: Arabic Diglossia and Its Impact on the Quality of Education in the Arab Region. The World Bank. The Mediterranean Development Forum. <http://files.eric.ed.gov/fulltext/ED456669.pdf>

13 Diner, D. (2009): *Lost in the Sacred: Why the Muslim World Stood Still*. Princeton: Princeton University Press.

14 United Nations Development Programme (2003): *Arab Human Development Report. Building a Knowledge Society*. New York: United Nations Development Programme.

15 Maamouri, M. (1989): Language Education and Human Development: Arabic Diglossia and Its Impact on the Quality of Education in the Arab Region. The World Bank. The Mediterranean Development Forum. <http://files.eric.ed.gov/fulltext/ED456669.pdf>

The United Nations condemns “the neglect of human capabilities” in the Arab world

This explains some of the shortcomings of the Arab world, but not those political failures that the first *Arab Human Development Report* bemoaned when it referred to the neglect of human capabilities in the region.¹⁶ Even if the Arab countries, like many other states of the world, have made progress in improving domestic literacy rates, there are still fewer people in those countries who can read and write than the global average or even the mean for developing countries. Owing to strong population growth, the absolute number of illiterates is, in fact, growing in some countries. In particular, young girls are denied access to schooling or further education – not only because of official regulations but also because parents and society either have no interest in gender equality or have misgivings about it. Sixty percent of Arab children who will never be able to attend school are young girls – an indicator that has not improved since 2000.

However, there are considerable differences within the Arab world as regards progress made in education for young men and women. In Algeria and Jordan, for example, more than 80 percent of all women between 15 and 44 have attended school at least until the age of 15. In Tunisia and Egypt the corresponding figure is 74 percent.¹⁷ These shares have increased significantly in recent years.

In other countries, such as Sudan and Yemen, many children do not go to school at all, according to UNESCO, the educational organisation of the UN. Both are highly fragile states in which the Islamists from Boko Haram, Al-Qaeda or Al-Shabaab have considerable potential to extend their reach. In Yemen two-thirds of all adults belonging to the middle class have had no formal education whatsoever.¹⁸ Even the wealthy oil states have been unable to provide children from socially disadvantaged families with the most basic level of knowledge.¹⁹

Another focus of criticism of the United Nations is the continued discrimination against women in many Arab countries. The idea that women are inferior is so deeply

16 United Nations Development Programme (2002): *Arab Human Development Report. Creating Opportunities for Future Generations*. New York: United Nations Development Programme.

17 Wittgenstein Centre (2015): *Global Human Capital Data Sheet 2015*. Vienna: Vienna Institute of Demography, Austrian Academy of Science. <http://www.iiasa.ac.at/web/home/research/researchPrograms/WorldPopulation/PublicationsMediaCoverage/ModelsData/GlobalDataSheet2015.pdf>

18 United Nations Economic and Social Commission for Western Asia (2014): *Arab Middle Class. Measurement and role in driving change*. Beirut: United Nations.

19 UNESCO (2014): *Teaching and Learning: Achieving quality for all. 2013/14 EFA Global Monitoring Report*. Paris: UNESCO.

anchored in public opinion that one of the reports devoted an entire paragraph to sayings that are disparaging towards women. Among other things, they suggest that women have only half a brain, half a faith or half the number of genes and therefore are worth only half of what men are worth. The same report notes that in Saudi Arabia the dominant ultra-conservative Salafi movement, which is intent on regulating the daily lives of people down to the smallest detail, is especially active in denying women equal access to public spaces. Women are almost entirely absent from politics. In many places they remain largely excluded from higher education to this day.²⁰ In Egypt 47 percent of all women over the age of 25 have never attended or only partly attended primary school, while the same applies to 54 percent of women in Syria. Even in the oil states Saudi Arabia and Kuwait, which have hardly been able to complain about a lack of money for decades, the corresponding figures are 28 percent and 31 percent, respectively.²¹ Thus it is no wonder that female employment in the Arab countries is by far the lowest in the world.²² Under these conditions a significant part of society remains barred from contributing to the economy and the wellbeing of society.

Little interest in science and research

Nowhere in the world is interest in the printed word as little as in the Arab world. While the combined population of the Arab countries was some 250 million around the turn of this century, just 330 books a year were being translated from other languages into Arabic. Even Greece, a small country, produced five times as many. The number of books translated into Arabic since the 9th century is roughly the same as the number translated into Spanish in any one year. Moreover, the content of many of these books is not secular but purely religious. Thus the Arab countries have no real access to the international knowledge market. The lack of interest in books can be attributed not only to illiteracy, which remains widespread, but also to omnipresent state censorship, as a result of which the most interesting books do not appear on the market at all.

The neglect of education and science is reflected in all areas of society: despite its oil wealth, the Arab world uses only 0.4 percent of its gross national product for research

20 United Nations Development Programme (2005): *Arab Human Development Report. The Acquisition of Human Capabilities*. New York: United Nations Development Programme.

21 Wittgenstein Centre (2015): Global Human Capital Data Sheet 2015. Vienna: Vienna Institute of Demography, Austrian Academy of Science. <http://www.iiasa.ac.at/web/home/research/researchPrograms/WorldPopulation/PublicationsMediaCoverage/ModelsData/GlobalDataSheet2015.pdf>

22 United Nations Economic and Social Commission for Western Asia (2014): *Arab Middle Class. Measurement and role in driving change*. Beirut: United Nations.

and development. Japan, which has almost no natural resources, uses 2.9 percent and Finland 3.4 percent. Scientists play virtually no role either in public life or in the media and are unable to serve as role models. Children and young people seldom hear anything about the meaning and purpose of research – the exception being at private schools. In the Arab world just 373 scientists per 1 million inhabitants have full-time employment. In all developing countries 398 researchers per 1 million inhabitants have work on average, compared with the global mean of 1,081 and a total of no fewer than 7,423 in high-tech Finland.²³

Those who nonetheless succeed in obtaining a good education are by no means assured of finding appropriate employment. The result is an exodus of qualified professionals: in the case of Sudan, there are estimates that between 1960 and 1990 around half a million technicians and scientists turned their backs on the country.²⁴ Lebanon, for its part, has seen more than half of its researchers leave to seek opportunities abroad.²⁵ Meanwhile, almost the entire scientific elite has been driven out of Syria. Thus it is hardly surprising that the Arab countries' capacity for innovation is weak, and that dependence on imported products and technology is all the greater for that reason. Almost inevitably, the widespread feeling of intellectual inferiority is growing, as is the dependence on technologically superior countries and the desire to move away from this part of the world.

Countries such as Iraq, Jordan, Oman, Qatar and Saudi Arabia are world leaders in terms of per capita expenditure on the military and weapons. Through this unproductive expenditure, such states attempt to maintain public security, keep their own military happy, put up a defence against supposed enemies both at home and abroad, or support the enemies of their enemies, which is the most popular form of foreign policy in the Middle East. Indeed, the region is paralysed far more by the power struggles between the various national, Islamic-religious and ethnic groups within the Arab world than by the longest conflict in the modern history of humankind – the confrontation between Israel and its Arab neighbours.

Virtually no contribution to the global knowledge pool

The results of Arab science are correspondingly poor, not least in comparison with the aspiring emerging countries in Asia: as recently as 1981 China, which at that

23 United Nations Development Programme (2014): *Arab Knowledge Report 2014: Youth and Localisation of Knowledge*. Dubai: Mohammed bin Rashid Al Maktoum Foundation & UNDP/RBAS.

24 Segal, A. (1996): Why Does the Muslim World Lag in Science? *Middle East Quarterly*, 3 (2): 61-70.

25 United Nations Development Programme (2014): *Arab Knowledge Report 2014: Youth and Localisation of Knowledge*. Dubai: Mohammed bin Rashid Al Maktoum Foundation & UNDP/RBAS.

time was still backward, produced just half the number of scientific publications that appeared in the entire Arab world. Around 2000 it was already producing twice as many. In 2013 Chinese scientists published 260,000 works and their Arab counterparts just 40,000. But even then massive support from abroad was required: Saudi Arabia, where a legion of researchers was hired at considerable expense, accounted for 14,000 publications.²⁶

A ranking of the 200 leading universities in the world published by the Jiao Tong University in Shanghai, China, on the basis of six objective indicators includes two institutions from the Arab world – both of which are to be found in Saudi Arabia and are endowed with almost unlimited means.²⁷ Yet the only Arab Nobel Prize winner in the field of science was the Egyptian-born chemist Ahmad Zewail (1999), who, however, was honoured for his work at the California Institute of Technology in the United States.

The scientific and technological backwardness of the region is most clearly evident from the number of inventions that are patented: in 2013 the entire Arab world, whose population has grown to 375 million in the meantime, registered some 1,800 new patents. Israel, where just 8 million people live, registered 4,789 patents and China 154,000. Some 244,000 patents came from the United States.²⁸

The labour market provides the clearest illustration of the consequences of the technological and scientific backwardness: for the last two and a half decades the region has recorded almost no economic growth, but it has witnessed rising unemployment.²⁹ In 2007 the Arab world was less industrialised than it was in 1970. Because the private sector is poorly developed, most academics aim to work for the state, which is why non-scientific disciplines are most in demand. In oil states such as Kuwait, Oman, Qatar and the United Arab Emirates more than 50 percent of the indigenous workforce are employed at government offices. Nonetheless, the state sector is far from able to absorb all those who have studied; consequently, the level of unemployment among academics is very high. Even in wealthy Saudi Arabia 43 percent of graduates are out of work. In many Arab countries unemployment is much higher among academics than among those who have had no education. In Egypt almost 18 percent of inhabitants with a university degree number among the

26 Scimago Journal & Country Rank, http://www.scimagojr.com/countryrank.php?area=0&category=0®ion=all&year=2013&order=it&min=0&min_type=it

27 Academic Ranking of World Universities, <http://www.shanghairanking.com/de/>

28 World Intellectual Property Organisation, www.ipstats.wipo.int

29 United Nations Development Programme (2009): *Arab Human Development Report. Challenges to Human Security in Arab Countries*. New York: United Nations.

poor or those threatened with poverty. In Yemen the corresponding figure is more than 30 percent, a share that has increased sharply in recent years.³⁰

Dangerous oversupply of young people

For those personally affected, unemployment, despite having received an education, is a professional tragedy – for society, it signifies a political time bomb. This is because the number of young people in the Arab world continues to grow very strongly owing to the high birth rates of the past. In the successful developing and emerging countries, these were the people who shared responsibility for the economic boom, for the reaping of the demographic dividend (see Chapter 3). But that was possible only because the government and the corporate sector were able to offer them not just an education but also employment.

In contrast, the young adults of the Arab countries constitute a dangerous oversupply of young people – a “youth bulge” – who are far from offering a demographic dividend but could cause a demographic disaster. For wherever large numbers of young people (above all, young men) fail to find a place in society and have no chance of securing adequate employment, the danger of social unrest and armed conflict increases. Societies in which those aged 15-24 account for at least 25 percent of the adult population are considered especially prone to conflict. They include Iraq, Syria, Yemen, Somalia and the Palestinian autonomous regions. In global terms the largest number of states facing the potential dangers associated with the youth bulge are to be found in Africa and the Middle East.³¹ If these young people are not provided with both education *and* jobs, the Arab world will “lose its historic chance to transform the youth oversupply into wealth”, the United Nations writes.³² Instead, the lack of education and knowledge threatens to spread further, as does unemployment and poverty, and hence the theatres of conflict that are both the cause and the consequence of the clash of education cultures.

Just how big that threat is can be seen, once again, from the labour market: during the period 2014-2020, some 17 million new jobs would be needed just to prevent the already very high level of unemployment from rising even further. In Saudi Arabia

30 United Nations Economic and Social Commission for Western Asia (2014): *Arab Middle Class. Measurement and role in driving change*. Beirut: United Nations.

31 Kröhnert, S. (2006): *Warum entstehen Kriege? Welchen Einfluss die demografische und ökonomische Entwicklung auf die Entstehung bewaffneter Konflikte haben*. Berlin: Berlin Institute for Population and Development.

32 United Nations Development Programme (2014): *Arab Knowledge Report 2014: Youth and Localisation of Knowledge*. Dubai: Mohammed bin Rashid Al Maktoum Foundation & UNDP/RBAS.

alone, around 300,000 new jobs for local inhabitants would have to be created each year because of the high population growth. To make use of the creative energy of all young people and, at the same time, pave the way for women to enter the labour market in a way that promotes prosperity and peace – as the Asian tiger states have managed to do – the Arab world would have to conjure up as many as 56 million new jobs in this short period. Until now, there has been nothing to suggest that this could in fact happen.

Can knowledge and success be bought with petrodollars?

Of course, all these problems and the numerous analyses are well known in the Arab world too. For this reason, some of the wealthy oil states – Saudi Arabia, Kuwait and the United Arab Emirates, for example – have been trying to compensate for their research deficit by investing massively in state-of-the-art universities. However, their guiding principle is to purchase foreign experts and technology, that is, to “buy” knowledge rather than to produce it with their own means.

What the oil states are lacking is a broad base of people with a general education who have the ambition to achieve something themselves. However, it is difficult to develop such motivation in countries in which the upper class has no need of gainful employment because the state is frequently able to provide a livelihood on the basis of high revenues from the sale of oil. In the natural resource-rich countries most everyday work is in any case performed by Nepalese construction workers, Indian bookkeepers and European or American engineers. The air-conditioned malls in Dubai, Doha or Abu Dhabi offer every imaginable luxury from all over the world, but the attractive facade is the consequence of the oil revenues of those countries and not their own economic production.

Development experts describe this situation as the “resource trap”.³³ Because money virtually flows in all by itself, entrepreneurship and the capacity for innovation atrophy. It is precisely in those countries spoilt by the availability of natural resources that very little is invested in human resources. This is because from a superficial economic perspective it is simply not worth doing so: the population is a cost factor since, on the one hand, it requires expensive infrastructure in the form of schools, roads and hospitals and, on the other, is not very productive and generates only meagre state revenues compared with the sale of oil. What is absurd – and what distinguishes such countries from the industrial nations – is that well-qualified members of society cost a lot but bring in very little. The upper strata of society occupy the top positions because they belong to the right families and not

33 Auty, R.M. (1993): *Sustaining Development in Mineral Economies: The Resource Curse Thesis*, London: Routledge.

because they are particularly competent. The founders of innovative enterprises such as Robert Bosch, Henry Ford and Bill Gates would hardly have had a chance to develop and become billionaires in these countries.

Thus the countries rich in natural resources illustrate the opposite model to that of the natural resource-poor, high-achieving countries, such as Finland, Mauritius, South Korea and Singapore, which were described in Chapter 3. Such countries had no choice but to exploit the human capital of their population and thereby boost development. Every euro, rupee, won or dollar that was invested in education increased economic productivity.

The bottom line is that despite billions of petrodollars, the oil states have not yet managed to establish an education system that is oriented towards the needs of both the population and research, to make use of acquired knowledge at enterprises and to employ their own educated young people productively according to their acquired skills.

Whether this deficit can be rectified by the spanking new elite universities in the Gulf is the big question. For good science requires not only a broad base of well-educated young people but also freedom of thought. Modern science needs a secular environment that is free of religious and state shackles. Such an environment hardly exists in a country such as Saudi Arabia, where it is forbidden to teach Darwin's theory of evolution, where the "fall from faith" brings with it the death penalty and where a blogger like Raif Badawi could be sentenced to 1,000 lashes because he had described the adherents of various religions as being equal.

Boasting one of the highest per capita incomes in the world, the Gulf state of Qatar – which has just 300,000 inhabitants (about the same as Iceland) and around six times as many guest workers, most of whom have no rights – has to import students to fill the lecture halls of its "Education City" on the outskirts of Doha. Qatar's delusions of grandeur not only extend to hosting the FIFA World Cup in 2022, but have also resulted in the construction from scratch of the world's largest university (in terms of area) on 14 square kilometres of desert. Branches of six American as well as one British and one French university have been established at that institution.³⁴ However, the vast majority of young Arabs do not gain admission to study there – the exorbitantly high tuition fees make sure of that.

All that could change if there were, for example, large-scale scholarship programmes for talented young people from other Arab countries. At the same time it would probably prove more difficult to change a fundamental understanding among Arab societies that constitutes possibly the biggest obstacle to successful development:

34 Al-Shobakky, W. (2008): Petrodollar Science. *The New Atlantis*, 22, <http://www.thenewatlantis.com/publications/petrodollar-science>

the “pronounced sense of self-worth based on alleged religious and civilisational superiority”, which the historian Dan Diner describes.³⁵ In other words: because the Arab world, for whatever historical or religious reasons, regards itself as superior, it cannot officially stoop to copying even some of the “Western” success formulas such as putting education at the centre of development.

Because there is virtually no critical scientific debate about technologically and economically advanced cultures, conspiracy theories abound. Whereas the Confucianist East Asian cultures looked within themselves in order to find the reasons for their developmental backwardness, the Arab interpretation was that forces from outside were invariably responsible for the stagnation of development: the medieval crusades of Christianity, the influence of the Turks in the Ottoman era, suppression during the colonial period and, not least, the Western-sponsored transplantation of the Jewish state of Israel into the heart of the Arab world. Many researchers consider these traumatic historical events to be the main reasons why the Arab world rejects rational science, secularisation and a modern culture of education.³⁶

Islamic reform efforts

In the public debate the developmental backwardness of the Arab world is frequently explained in terms of the religion of Islam, which never underwent either a reformation or an adjustment to the modern era. A glance at the rest of the Islamic world shows, however, that this assumption can hardly be right. For some Islamic states outside the Arab world are much more favourably disposed towards reform and open to the advantages of a modern knowledge society. Moreover, none of them has the problem of the diglossia of the Arabic language. While they revere Arabic as the sacred language of the Koran, in their daily lives they speak the language that they also use in writing, which, in each case, is open to all elements of the modern era.

Even in the Arab World there have been attempts at reform that were based on the simple realisation that other cultures had been more successful in terms of development. In Egypt, which has the largest population of the Arab states, Mehmed Ali Pasha (1770-1849), a mercenary soldier from Macedonia who wanted to modernise the country, appeared towards the end of the period of Ottoman subjugation. Celebrated as the founding father of modern-day Egypt, Ali reorganised

35 Diner, D. (2009): *Lost in the Sacred: Why the Muslim World Stood Still*. Princeton: Princeton University Press.

36 Diner, D. (2009): *Lost in the Sacred: Why the Muslim World Stood Still*. Princeton: Princeton University Press.

the administration, attempted to develop an industrial sector with export capability and sent young people to be educated in Europe. However, Ali, who himself did not learn to read and write until he had turned 40, was a technocrat rather than an education reformer. Adopting an authoritarian manner, he wanted (just like today's leadership in Saudi Arabia) to renew his country from the top without involving the people. In the end, his concept failed.

Turkey – more modern than the president allows

More success was achieved in Istanbul by Mustafa Kemal (1881-1938), an Ottoman officer from a humble background who surmounted many obstacles to successfully complete his schooling and attend the Military Academy later on. It was Kemal who in 1923 built the Turkish Republic from the remnants of the disintegrating Great Ottoman Empire and became its first state president. He wanted to overcome the backwardness of his country with a rapid reform of society based on the model of the successful European states and thereby broke virtually every taboo. He regarded the Islam practised at the time as irrational and backward, promoted access to education for all children and pushed through the separation of religion and state.

Kemal banned religious brotherhoods and prohibited men from wearing the fez and turban, the Oriental head gear, in public. He advocated the equality of the sexes and in the 1930s – earlier than in some European countries – introduced the vote for women. For his citizens he decreed adoption of the Gregorian calendar, the metric system, the Latin alphabet and Sunday as public holiday. After 1933 he took in scientists who had been driven out of Germany by the National Socialists. They were meant to help him modernise the country. He had schools built everywhere and the universities modernised. He turned the Hagia Sophia, which had been built as a church by the Christians of Constantinople and had served as Istanbul's main mosque during the Ottoman era, into a museum that was from this time onwards called the "Temple of Science".³⁷ To make the administration more effective, every Turk was obliged for the first time to take a surname. This was how, in 1943, Kemal acquired the name "Atatürk", which the Turkish National Assembly bestowed upon him. That name essentially means "Father of the Turks".

In the midst of Islamic culture Atatürk came across like a disciple of the European Enlightenment and expected his people, most of whom were illiterate at the time, to undergo a thorough modernisation process that proved too much for many. It was as if Martin Luther had expected the Germans of the late Middle Ages to cope all at once with the emancipation of women, a multicultural society and television with 20 channels. Shortly after Atatürk's death it became clear that his reforms had failed to convince all strata of society but only, above all, the middle class in Istanbul.

37 Kreiser, K. (2011): *Atatürk. Eine Biografie*, München: C.H. Beck.

The population in the remote rural parts of the country had remained traditionally Islamic, poor and barely educated. Ethnic minorities such as the Kurds, who had still been his comrades-in-arms during the war of independence, fell victim to the new Turkish nationalism. Contrary to what Atatürk had planned, Turkey had not become part of the enlightened West.

Nonetheless, on the basis of groundwork laid by Atatürk, Turkey was able to develop into an aspiring emerging country at the end of the 20th century. Today, with a per capita gross domestic product of some US\$ 10,000, it is doing better than the much extolled BRICS states China, India and South Africa as well as the EU member states Bulgaria and Romania.³⁸ In many respects Turkey is more modern than the Arab countries and, in terms of gross domestic product, the 18th largest economy in the world. Moreover, notwithstanding all the justified criticism of the political situation within the country, it is the most democratic state in Muslim West Asia.

However, Turkey, like other countries, is not guaranteed continued success. Economic growth has declined significantly in recent years. As before, many people continue to work in the large informal sector or at microenterprises, where productivity is particularly low. While all young people have access to education and about half of all women have at least finished secondary school – indeed, 13 percent even have a university degree – the quality of education is often considered unsatisfactory.³⁹ In 2012 just 53 percent of people aged 20 to 64 were gainfully employed.⁴⁰ Women, in particular, frequently work for no wage.⁴¹ For these reasons, Turkey is by no means realising all its potential and is being left behind by the more dynamic emerging countries.

Meanwhile, Turkish President Recep Tayyip Erdogan is attempting to demythologise Atatürk as the universally respected founder of the state and to reverse the course of history. Erdogan sees himself as the defender of traditional Islam and classical values: he believes that students should once again learn Old Ottoman, which was written in Arabic characters. He would like to introduce Sunni Muslim education from the first school year onwards, even though many Turks are not of that religious

38 Weltbank. World Development Indicators. <http://data.worldbank.org/data-catalog/world-development-indicators>

39 Bertelsmann Stiftung (2014): Bertelsmann Transformation Index 2014: Turkey country Report. <https://www.bti-project.org/en/reports/country-reports/detail/itc/TUR/>

40 International Labour Organization (2013): Key Indicators of the Labour Market (KILM) 8th edition. Geneva: ILO. <http://kilm.ilo.org/2011/Installation/Application2013/kilm13install.htm>

41 International Labour Organization (2013): Key Indicators of the Labour Market (KILM) 8th edition. Geneva: ILO. <http://kilm.ilo.org/2011/Installation/Application2013/kilm13install.htm>

persuasion. The rights of women and ethnic and religious minorities are being increasingly curbed.⁴²

Whether the return to Old Ottoman is a forward-looking decision at a time when what young Turks are actually lacking is a knowledge of foreign languages remains open to debate. Equally questionable is whether the secularisation of society can be prevented by a politically decreed return to “classical values”. For as a result of increasing prosperity and improved education, Turkey, too, has witnessed something that all over the world goes hand in hand with socio-economic development: in the recent past the demographics of the country changed rapidly. While during the period 1950-55 Turkish women had on average 6.6 children, today the fertility rate has already fallen to 2.1. This is a clear sign of the increased self-confidence of the young (in particular, female) population, which, thanks to the improved education system, sees new opportunities and wants to take its fate into its own hands. Thus Turkey is already much more “modern” than the president wants to believe.

Iran – a modern society under the thumb of the mullahs

In this sense, Iran – Turkey’s eastern neighbour – is more developed. Over the past decades the Islamic Republic, in which religion officially plays a central role in all policymaking, has undergone a sweeping social transformation that has hardly been noticed in the West: from the 1980s onwards the country experienced the most rapid fall in the fertility rate in the history of humankind. Within one generation the number of children per woman dropped from more than 7 to fewer than two. Even during the social transformation on the island of Mauritius (Chapter 3), this did not happen so quickly. As in the case of Mauritius, the drivers of change were family planning programmes and improved education for women, even in rural areas. In 1989, in order to curb the extremely high population growth at that time, the successors to Khomeini, the leader of the revolution, adopted the slogan “Fewer children, a better life” to call for the people themselves to limit the size of their families. The state provided contraception free of charge and invested in a nationwide health system. Couples had to take part in family planning courses, otherwise they could not obtain a marriage licence. At the same time the government promoted the education of young boys and girls, particularly in the remote rural regions.

Today just 31 percent of all women over 25 did not finish primary school, of which the majority belong to those generations that were denied the opportunity to attend school during childhood. By comparison, the corresponding figure in

42 Hasnain, K. (8 Dec 2014): Erdogans Bildungspolitik Zurück ins Osmanische Reich. Der Spiegel online, <http://www.spiegel.de/politik/ausland/tuerkei-erdogan-fordert-unterricht-in-religion-und-osmanisch-a-1007264.html>

Egypt is 47 percent. Since 1979 the number of students has increased from around 100,000 to more than 2 million. Seventy percent of those studying natural sciences or engineering at Iranian universities are women.⁴³

In Iran education and science were already highly valued when the country still went by the name of Persia. It was here that the most respected astronomers, physicians and mathematicians worked in the Middle Ages. Today Iran accounts for one third of all scientific publications that stem from the entire Middle East and North Africa. The high regard for education is also evident from scientific achievements, for example, in the form of patents: thus in 2013 Iran recorded almost twice the number of patent registrations (3,416) as all Arab countries combined and was the only country in the region that could compete to some extent with the high-tech nation Israel (4,789 patent registrations).⁴⁴ This is the reason why Israel sees Iran, which lies at a distance of 1,500 kilometres away, as posing a far more serious threat than the Islamists from Al-Qaeda or the “Islamic State”, which are spreading terror in the immediate neighbourhood. While the “soldiers of God” have to wage war with stolen weapons, do not run any research laboratories and are far removed from having a capability for scientific innovation, Iran has the technical competence to develop and build complicated weapons systems, including even nuclear missiles.

Over the past 100 years Iran’s history has been characterised time and time again by attempts either to open up to modern Western life or by the need to preserve strict religious traditions. Opening up would not be a problem today, since a peaceful, economically successful society could rapidly be developed thanks to the capabilities of the Iranian people.

Bangladesh – further developed than the brother nation Pakistan, despite poverty

Far gloomier is the situation as regards education and science in Iran’s two neighbouring countries – Pakistan and Afghanistan. In Pakistan 68 percent of female adults have not finished primary school. There are no reliable data on education in Afghanistan, but it is likely that the situation there is even more problematic. Pakistan is caught in a fatal cycle of incompetent, corrupt governments and opposition movements that are rapidly being radicalised. On the one hand, the widespread lack of education provides fertile ground for radical Islamism; on the other, the Islamists are blocking access to schools and universities, above all, for girls and women. Attacks such as the one against the schoolgirl Malala Yousafzai are

43 Ehsan, M. (2006): Islam and Science: An Islamist revolution. *Nature* 444 (7115): 22-25.

44 World Intellectual Property Organisation, www.ipstats.wipo.int

a daily occurrence. It is estimated that during the period 2003-2015 some 60,000 people became victims of the terror and violence in Pakistan.⁴⁵

What influence education and the equality of women have on development can be seen from a comparison of the Muslim countries Pakistan and Bangladesh. Both countries not only have a common history, religion and culture; until 1971 they formed a single state. At that time 6 to 7 children per woman was the norm in both parts of the country and the population was growing at such a pace that the number of people would have doubled within some 24 years.

After a bloody war of independence Bangladesh, the former East Pakistan, numbered among the poorest countries in the world and was considered a hopeless case as regards development policy: in 1980 the country already had almost 100 million inhabitants and was the most densely populated country in the world but just the size of the US state of Iowa. Today 165 million populate Bangladesh. Many parts of the country lie just a few metres above sea level and are constantly flooded by the monsoon overflows from the Ganges and Brahmaputra as well as repeatedly ravaged by powerful cyclones. In Bangladesh the per capita area of farmland is no larger than the size of the plot of land that goes with a more upmarket detached house in Western countries. Since the founding of the state, the question of the viability of Bangladesh has been linked to the question of how the growth of its population could be curbed.

For this reason development organisations began at an early stage and with the explicit support of the Bengali government to promote schools, health services, family planning and microcredit programmes for women. The level of success was impressive: today women in Bengal use contraceptives to the same extent as their counterparts in Belgium or France. The average number of children per woman has since dropped to 2.3 and thereby reached the level at which a population nearly ceases to grow in the medium term. If before independence the vast majority of young people entered adulthood as illiterates, as early as 2009 almost all children were able to attend at least primary school. Special programmes for poor families made it possible for even their children to go to school. In 1994 the government launched a programme to provide secondary education for young girls to prepare them for careers as teachers and medical doctors, among other things, and to protect them from early marriage through the lengthy training.⁴⁶

45 South Asia Terrorism Portal: Fatalities in Terrorist Violence in Pakistan 2003-2017, <http://www.satp.org/satporgtp/countries/pakistan/database/casualties.htm>

46 Berlin Institute for Population and Development (2015): Same trajectories, diverging results. How Bangladesh overtook Pakistan in the demographic transition. Working paper for World Bank Report. <http://www.berlin-institut.org/publikationen/gutachten/how-to-foster-a-dividend.html>

In the meantime discrimination against girls in education has become a thing of the past. Today more girls than boys attend secondary school. And all of society benefits from this, since women who have fewer children and a better education are more likely to pursue paid work. That means higher family incomes and a higher social status for women, so that they have a bigger say in decisions – among other things, about the number of children. Bangladesh has exchanged the cycle of poverty for that of successful development.

But what works in Bangladesh can be implemented in Pakistan only with difficulty. From the start, the religious leaders opposed family planning. The use of contraceptives was slow to take off. Everything that was undertaken by Bangladesh to combat poverty followed later in Pakistan with little enthusiasm and frequently against internal opposition. While Pakistani children are obliged by law to attend primary school, almost 20 percent of girls have never seen the inside of a school. Overall, the government in Pakistan invests significantly less money in the education system than does Bangladesh. Even to this day up to 60 per cent of women over 15 are illiterate. As always, developmental backwardness and gender discrimination are reflected in the number of children per woman: at 3.8, this indicator is significantly higher in Pakistan than in Bangladesh. Among the larger Asian countries, the situation is worse only in Afghanistan.

To be sure, Bangladesh is anything but a stable, orderly, democratic or secure country. Moreover, it remains significantly poorer than Pakistan: per capita income is around one third lower than in Pakistan. But the Bengali economy is growing much faster than that of Pakistan and the former is much more modern when factors such as education, the fertility rate, gender equality and job opportunities are taken into account. Above all, this can be seen from the most important cross-sectional indicator for human wellbeing – life expectancy – which in Bangladesh is five years longer than in Pakistan.

Owing to its stunted development, Pakistan is likely to further witness rapid population growth: from 200 million today to 314 million by 2075, or even 450 million under adverse conditions, along with all the problems that will bring. Bangladesh, on the other hand, is already seeing its population growth slow down and can expect a welcome decline in the number of its inhabitants from 2050 onwards. Bangladesh has achieved educational standards that qualify it to move up into the ranks of the tiger states. On the other hand, Pakistan, which is being torn apart by internal conflict, risks the danger of being crushed in the clash of education cultures and becoming a failed state.

Indonesia and Malaysia – Islamic success stories

Finally, farther to the south-east of the Asian continent lie two countries that, though predominantly Islamic, do not reinforce the common prejudiced view that “Muslims obstruct development”: Malaysia and Indonesia. With its more than 250 million inhabitants, the latter is half the size of the European Union, a demographic heavyweight and the country with the largest Muslim population in the world. Both states are developing along the typical lines of the Asian tigers – that is, initially run by more or less authoritarian regimes that push ahead with modernisation by investing heavily in education and jobs and then later make way, either voluntarily or involuntarily, for elected governments. Within one generation both countries have put widespread poverty behind them and moved up into the ranks of the so-called middle-income emerging countries. They are industrialised to a large extent, report a high life expectancy and offer their citizens universal access to all levels of education. In contemporary Indonesia, 68 percent of young women between 15 and 44 have finished the equivalent of a vocational secondary school; in Malaysia, the figure is as high as 93 percent.

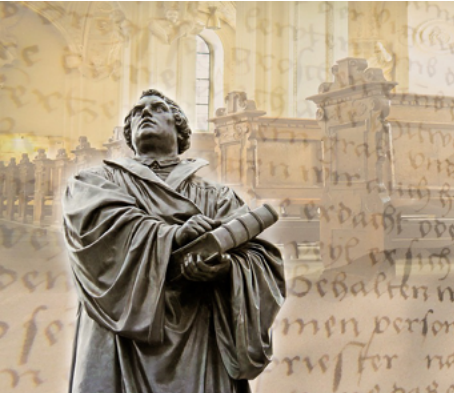
Above all, Malaysia stands for a stable, continuous economic upswing. It is now the third-strongest economy in South-east Asia – and that despite the two bigger economies, Indonesia and Thailand, having eight times and twice as many inhabitants, respectively. But Malaysia is by no means following a purely Western economic model; rather, it is using the basic tenets of the Islamic faith to develop: the country is among the most competitive markets providing Islamic financial services.⁴⁷ This segment of the money economy, which is growing worldwide, takes its lead from the regulations of the Koran that prohibit earning interest and engaging in speculation, and replaces those activities with profit-sharing or imposing fees: “Those who accept interest will one day stand before their maker as none other than one who has been seized and beaten by Satan”, states Surah 2, Verse 275. This type of financial activity has definite advantages. Perhaps its basic tenets would have prevented the latest major financial crisis had they been followed by the West as well.

A look at the map of the Islamic world shows that the greater the distance between an individual country and the spiritual centre of the religion – Mecca, Saudi Arabia – the better the chances of that country developing. This applies equally to Tunisia and Morocco in the West and Indonesia and Malaysia in the East. These countries are better protected from falling into the trap of religious fundamentalism, lack of education and social stagnation. Thus it is by no means the Islamic faith itself that proves an obstacle to development in certain countries; rather, it is the political

⁴⁷ Biswas, R. (2013): *Future Asia: The New Goldrush in the East*. Basingstoke: Palgrave Macmillan.

and religious institutions that, using the arguments of the religion, generate social inequality and prevent people from seeking their fortunes freely and independently.

Wherever power is held by unimaginative governments and fanatical religious commissars who neglect the education of the population at large and, in particular, of women, development stagnates and crises are exacerbated by population growth. In those countries where education for women is allowed or even promoted, the more likely outcome is prosperity and peace.



5

AFRICA AND INDIA: TWO BIG UNKNOWNNS

Enormous population growth
and education deficits

Judging by countries which worked their way up from a low level of development to become affluent societies within a few decades, we have seen that on top of all that widespread basic education for the majority of the country's population is necessary – education for all – before economic success sets in. This general pattern of the temporal sequence holds in all cases discussed, in Finland, Mauritius, Singapore and South Korea. We have also seen how the Arab world was held back for centuries through its prohibition of book printing and consequently lost its former competitive edge. But there are still other parts of the world that are at very early stages of development where the majority of the population has never been able to enjoy the benefits of a basic education. Most of these countries are located in Africa, and not coincidentally these are among the poorest countries in the world. South Asia is another problem area, with a long tradition of intellectual elites. Since many people have traditionally been excluded from literacy for a long period of time, large sections of society remain marginalised, as for instance in India.

In the latter case 264 million people are still illiterate, more than in any other country in the world. This figure is equivalent to half of the population in the EU. In the sub-Saharan countries of Africa about 200 million people cannot read or write, 59 percent of whom are women;¹ 30 million school-age children receive no education and are not likely to get a chance to do so in the future. In West and Central Africa this holds true for almost a third of all girls – tomorrow’s mothers.² Throughout the entire African continent only 40 percent of young women have a lower secondary education, meaning that they have at least been to school up to the age of 14 or 15 years. In Europe the figure is 96 percent, in China 85 percent.

It is no coincidence that the poor countries of Africa are also those with the lowest life expectancy and the highest population growth. The latter represents a huge challenge: these countries must provide their young people with education opportunities that prepare them for the globalised world of the 21st century, when countries are increasingly becoming information societies. Furthermore, they must expand these education opportunities significantly, since the number of young people is rapidly increasing in most regions of Africa.

In sub-Saharan Africa today almost one third of the population is between 3 and 15 years old, so between the ages of preschool and lower secondary education. Overall, this amounts to 317 million children and adolescents. In 2030, i.e. in fifteen years time, this figure will have risen to approximately 424 million. By comparison, in the EU only 63 million people or one eighth of the whole population falls into this age group. The already much richer Europeans can therefore invest significantly more money in the education of their young population without exhausting themselves financially. In Africa an adequate education budget would be insupportable for most states, because they cannot possibly educate all the teachers that are needed, build enough schools, and produce enough teaching material that would be necessary for quality teaching.

An example of this dilemma is Niger, the West African country that must consistently serve as a bad example of record population growth in Africa. The country faces the challenge of providing proper schooling for 6 million additional children by 2030, and for those 4 million children who do not currently attend any school at all.³ But Niger has only 10 million people of working age; most of them are subsistence

1 UNESCO Institute for Statistics: Data Center, 2015. <http://www.uis.unesco.org/datacentre/Pages/default.aspx>

2 UNICEF (2015): *Fixing the Broken Promise of Education for All. Findings from the Global Initiative on Out-of-School Children*. New York: UNESCO Institute for Statistics.

3 UNICEF (2015): *The Investment Case for Education and Equity*. New York: UNICEF.

farmers or other workers in the informal sector, i.e. people who do not pay taxes to the state. The per capita economic output in Niger is equivalent to US\$ 440 per year.

How can the poor nation on the southern edge of the Sahara possibly bear its education burden alone and, in addition, finance health services? How will it build roads, organise its administration, control human traffickers across the Sahara and finance the military, which is necessary for the defence against the Boko Haram terrorists from neighbouring Nigeria? Achieving these tasks is only possible if the international community provides far more money than it does today for education and other services. Only in this way could we prevent more and more people sliding into poverty and a sense of hopelessness, or stop Boko Haram and ISIS spreading further, and halt refugee waves from Africa increasing dramatically. Only in this way could the situation be stabilised in the long term. So far, however, there is no indication that this problem is considered a top priority for international development policy, nor are the necessary resources devoted to address it.

Uphill or downhill?

Gloomy news has shaped discussions on Africa for a long time. This is in stark contrast to the African growth and success stories that have been circulating for several years. Consulting firms like McKinsey and Roland Berger celebrate the continent as the hotbed of a new economic miracle. Market researchers hail the rise of an African middle class and gigantic markets.⁴ While in 1980, according to the African Development Bank, only 126 million people on the African continent spent 2-20 dollars per day, by 2011 this figure had risen to almost 350 million. This is about one third of all Africans. By 2060, the Bank expects 1.1 billion middle-class Africans, which would be almost half of Africa's population that is expected to double by then.⁵ Nowhere is the number of dollar millionaires growing faster than

4 Hattingh, D. et al. (2012): The Rise of the African Consumer. Johannesburg: McKinsey & Company. <http://www.mckinsey.com/industries/retail/our-insights/the-rise-of-the-african-consumer>

Wessels, C. et al. (2012): Global Topics inside Africa. Munich: Roland Berger Strategy Consultants. <https://www.rolandberger.com/globaltopics/media/pdf/09-8799-9-web.pdf>

5 Mubila, M. & Aissa, M.-S.B. (2011): The Middle of the Pyramid: Dynamics of the Middle Class in Africa. AfDB Market Brief, African Development Bank, http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/The%20Middle%20of%20the%20Pyramid_The%20Middle%20of%20the%20Pyramid.pdf

in Africa. In Ethiopia alone the number of rich people rose to 2,700 people between 2007 and 2014, i.e. it more than doubled.⁶ Forbes now lists 55 billionaires in Africa.⁷

In fact, many economic indicators speak for Africa. Investment conditions have improved significantly. Currently, US\$ 50 billion of foreign capital are being invested in Africa – which is more than the continent receives from foreign development aid. Despite the Ebola crisis, West Africa's economy grew by 6 percent in 2014.⁸ Despite the current slackening of the global economy, Africa has achieved an average economic growth of 5 percent per year since 2000. Some countries, such as the resource-poor Ethiopia, which cannot generate its national income through oil, gold or diamonds, could even double its growth. In 2015 four African countries, Cote d'Ivoire, Ethiopia, Mali and Tanzania, were among the top 13 countries of the world that managed to obtain more than a 7 percent economic growth rate.⁹ The proportion of extremely poor Africans who live on less than US\$ 1.25 a day is decreasing continuously. And between 2000 and 2008 the proportion of young people who received a secondary education increased by 50 percent.¹⁰

But these positive messages are difficult to assess. Growth takes place at very low levels. Even if the middle class is growing and poverty rates are declining, 40 percent of all Africans are still considered extremely poor.¹¹ Because of high population growth, the absolute number of extremely poor people actually increased in some countries. In Niger, for instance, where the proportion of this population has generally decreased, 700,000 people lived in extreme poverty in 2015 than in 1990.¹² The situation will continue to worsen because the Nigerian population is expected to almost quadruple by 2050. Especially 15- to 24-year-olds, who suffer under a very high rates of youth unemployment throughout Africa, live below the poverty threshold.

6 Njiraini, J. (2015): Is Africa the new face of rising wealth and opulence? *Africa Renewal*, p. 28, <http://www.un.org/africarenewal/magazine/april-2015/africa-new-face-rising-wealth-and-opulence>

7 Forbes (2015): *The Forbes List Files. Africa's 50 richest*. <http://www.forbes.com/africa-billionaires/list/#tab:overall>

8 African Development Bank et al. (2015): *African Economic Outlook 2015*. <http://www.africaneconomicoutlook.org/en/>

9 The World Bank (2016): GDP growth. <http://data.worldbank.org/indicator/NY.GDPMKTP.KD.ZG>

10 Devarajan, S. and Fengler, W. (2013): Africa's Economic Boom. Why the Pessimists and the Optimists are both right. *Foreign Affairs* 68 (May/June): 68-81, <https://www.foreignaffairs.com/articles/west-africa/2013-04-03/africas-economic-boom>

11 UNICEF (2014): *Generation 2030 Africa*. New York: UNICEF.

12 Hermann, M. et al. (2015): *Consequential Omissions. How demography shapes development. Lessons from the MDGs for the SDGs*. Berlin: Berlin Institute for Population and Development.

A growing, young population of working age can be of great economic benefit, as the Asian tigers showed during their ascent. The two vital prerequisites for such an ascent are sufficient jobs and necessary skills and qualifications. But in the case of Africa, its massive population growth is challenged by a labour market which is already under immense pressure today. Because it is so difficult to find properly paid work, most Africans make do with subsistence farming or odd jobs. Between 2010 and 2050 an additional 830 million young people are expected to enter the labour market in sub-Saharan Africa alone, i.e. more than 20 million per year on average. By 2050 two thirds of the worldwide increase in potential labour will stem from Africa.

Whether Africa's economy will continue to grow strongly enough for all these young people to find work is a big question. It depends, among other things, on the political stability of individual countries. This, in turn, is contingent on how balanced economic growth will be spread among the entire population. But even in this regard Africa performs very poorly. Economic growth in many African countries is largely dependent on natural resources. Generally, only certain segments of the population may benefit from this and the revenues are highly dependent on the global economy. The sharp fall in world market prices for crude oil, platinum and minerals has already massively affected countries such as Nigeria, Zambia and Angola, jeopardises public finances and stability, and threatens the poor segment of the population most.¹³

Half of all African households do not even have access to electric power, which would be important, among other things, for setting up small businesses and increasing the share of the manufacturing sector. Africa provides only 2.5 percent of the global economic output and only 1 percent of the manufactured goods, with a downward trend. The share of the manufacturing sector in the economy has not changed since 1970. Even South Africa, the only industrialised country of the continent and part of the emerging BRICS countries, has been experiencing a loss of industrial jobs in recent years. In addition, the tourism industry, so vital for many African countries, suffers from the uncertain political situation and the growing number of terrorist attacks.¹⁴

The Human Development Index, the development indicator of the United Nations, lists 33 countries from sub-Saharan Africa in the lowest of its four categories, which is labelled "Low Human Development." Only nine of these very backward countries are located in different world regions. Conversely, only ten countries of the region are listed in the category with an average development (including South

13 African Development Bank et al. (2015): *African Economic Outlook 2015*. <http://www.africaneconomicoutlook.org/en/>

14 Wessels, C. et al. (2012): *Global Topics inside Africa*. Munich: Roland Berger Strategy Consultants, <https://www.rolandberger.com/globaltopics/media/pdf/09-8799-9-web.pdf>

Africa, Botswana and Namibia, as well as Ghana and the Republic of the Congo) and only two (Seychelles and Mauritius) display a high level of development.¹⁵ Sub-Saharan Africa is one of the few regions of the world which have largely missed the Millennium Development Goals (MDGs).¹⁶

All this hardly contributes to increasing the satisfaction of the African population. Disappointment gives rise to public protests, which can – as in the Arab Spring – evolve into widespread civic unrest. The main reasons for the riots are inadequate sources of income, poor working conditions and a lack of quality public services.¹⁷ Poor governance, a depressed labour market and social unrest easily lead to a downward spiral of political, religious and ethnic conflicts, such as some countries of the African continent are trapped in. This is where, by global standards, most failed states are located, particularly South Sudan, Somalia, Central African Republic, Sudan and the Democratic Republic of Congo.¹⁸ Countries are classified as “failed” when they cannot guarantee their citizens’ security, welfare and legal certainty. Other countries are, despite their positive economic development, at risk and can always suffer setbacks, including Mali, Nigeria and Kenya. It takes a very large dose of optimism to speak of an “Africa Rising”, as the British *Economist* declared in 2013 in a big cover story.¹⁹

One reason for the difficult situation, possibly the most important one, is Africa’s lack of human resources. In most regions the education and health status as well as the professional skills of the population do not suffice to make the country competitive on a global scale. Therefore, corporations still hold back when it comes to building manufacturing facilities and creating jobs. Although the per capita income in Africa is the lowest in the world, the wages of educated workers and labour costs are considered too high by international standards – for the simple reason that workers do not meet the standards of qualification expected in return for the wages they receive.²⁰

15 United Nations Development Programme (2014): *Human Development Reports*. <http://hdr.undp.org/en/content/human-development-index-hdi>

16 Hermann, M. et al. (2015): *Consequential Omissions. How demography shapes development. Lessons from the MDGs for the SDGs*. Berlin: Berlin Institute.

17 African Development Bank et al. (2015): *African Economic Outlook 2015*. <http://www.africaneconomicoutlook.org/en/>

18 Fund for Peace (2015): *Fragile State Index 2015*. <http://fsi.fundforpeace.org/rankings-2015>

19 *The Economist* (2013): Africa rising. A hopeful continent, 28 February.

20 Devarajan, S. and Fengler, W. (2013): Africa’s Economic Boom. Why the Pessimists and the Optimists are both right. *Foreign Affairs* 68(May/June): 68-81. <https://www.foreignaffairs.com/articles/west-africa/2013-04-03/africas-economic-boom>

Education of elites only

Africa definitely had a rather difficult start moving into the global education revolution. The development of humankind and also that of *Homo sapiens* began in Africa. It was also there that civilisations once evolved: one need only think of the Kingdom of Aksum in Ethiopia today, whose rulers trace their origins back to the biblical King Solomon; to the Kingdom of Ghana, which controlled the trade routes across the Sahara in the 11th century; or to the kingdom of the Nuer, Dinka or Azande that arose along the Nile. Africa was by no means a continent without a distinct history, as early colonial researchers thought. The Hamburg African explorer and historian Heinrich Barth (1821-1865) was one of the first to draw attention to the rich history of the continent after having studied African chronicles and explored the continent on his expeditions.²¹

But unlike in the Arab world, in Africa countries south of the Sahara no civilisations arose that could have contributed to the global knowledge base. Nowhere beyond the Arab World – except in Ethiopia – did a substantial written language develop on the basis of which knowledge could accumulate and be circulated. In addition, long before the colonial era Arab culture had spread far beyond the Sahara and established a pre-colonial literacy tradition along the caravan routes. But this kind of education was, as in the Middle Ages before the time of Martin Luther, always a matter of elites; the general population could never participate in it.

Whatever might have existed in terms of elitist, educated cultures in Africa was destroyed rather than further developed by colonial powers. Mass education was of no interest to the colonisers. This attitude only changed with the establishment of mission schools and when it became clear that the first African countries would be granted independence. Since only the young were educated in schools, however, two thirds of all adult African men and 85 percent of women remained illiterate up until 1970. A higher university education, which would have qualified a person for a leadership position in politics or business, was achieved by an estimated 1 percent of women and 2 percent of men.

Opportunities were distributed very differently in different regions. In Ethiopia, the only African country that was never fully colonised and that never hosted mission schools, 99 percent of adults were illiterate. Matters did not look much brighter in the former French, Belgian and Portuguese colonies. In Senegal only about 5 percent of women had attended school. The situation was slightly better in the British colonies. In Ghana, after all, 19 percent of women had at least a primary education, in Kenya 34 percent and in South Africa even 60 percent. Up to 1970,

21 Barth, H. (2012): *Travels and discoveries in North and Central Africa*. New York: Cambridge University Press.

men consistently enjoyed better access to basic education: the difference between men and women was particularly pronounced in Muslim North Africa. In Egypt at least 35 percent of men had been to school for a few years compared to only 14 percent of women.²²

Teachers as leaders

In the colonial era only very few members of the African elite enjoyed access to higher education. Some had been given the opportunity to study even before World War II by attending a European university. A large part of the first set of African presidents was recruited from this educated elite after the end of colonial rule. Many of them were situated on the political left and had the honourable goal as well as the genuine hope of being able to pave the way to modernity for their almost completely illiterate populations.

One of these leaders was the Tanzanian Julius Nyerere Kambarage (1922-1999), who was born on the eastern end of Lake Victoria. As a 12-year-old he attended school for the first time by travelling several hours every day to the town of Musoma, close to the later Serengeti National Park. The teachers of the Catholic mission school soon recognised young Julius's intelligence and made sure that he could study for a teaching degree at the University of Kampala. Nyerere became the first Tanzanian student ever to study at a British university. In Edinburgh, Scotland, he developed his idea of socialism, which was inspired by the traditional communities in African villages.²³

In 1960 Nyerere was elected the first Prime Minister of Tanzania, then as now one of the poorest countries in the world. A year later he led his country to independence. Nyerere, who was called *Mwalimu* (teacher) by his people, remained in power for more than two decades and collectivised farms, among other things, so that about 10 million farmers had to give up their private land. The experiment failed and agricultural production collapsed. Nyerere, in contrast to many other African leaders, accumulated no wealth for himself or his clan, but brought his country to the brink of ruin, like Stalin in the Soviet Union or Mao Zedong in China with their attempts at collectivisation.

But Nyerere was successful with his education reforms. As an opponent of elite education, which in his view only served to provide very few city residents with a high income in certain economic sectors, he tried to provide all his countrymen with a basic education. Not only high school students but also illiterate adults should

22 Wittgenstein Centre for Demography and Global Human Capital (2015): Wittgenstein Centre DataExplorer, <http://www.oeaw.ac.at/vid/dataexplorer/>

23 Molony, T. (2014): *Nyerere, the early years*. Melton: Boydell & Brewer.

benefit from it and learn practical activities. Indeed, President Nyerere succeeded in teaching most Tanzanians to read and write. For the president education was an essential part of liberation. “It is useless,” he wrote in his famous Declaration of Dar es Salaam, “for a farmer to learn how to grow the best soybeans, as long as he does not know anything about the nutritional value and the marketing possibilities of beans.”²⁴ Nevertheless, Nyerere’s presidential track record remains modest: in the 23 years during which he served as head of state, he did not significantly advance his country economically nor socially.

Even worse is the track record of Robert Mugabe, who has been responsible for the fortunes of Zimbabwe in southern Africa since 1980 and is by now the longest serving president in the world. He was a student at a Catholic mission in the former British colony of Rhodesia. Mugabe also became a teacher and later obtained seven different university degrees, including philosophy, pedagogy, law and economics. The early years of his presidency were marked by his socialist ideals; he heavily promoted health and education programmes, for example. One long-term consequence of these efforts is that Zimbabwe is nowadays the country with one of the lowest illiteracy rates in Africa; 87 percent of the adult population can read and write.²⁵ But Mugabe also lost interest in the common good at some point and went the way of many African potentates. Meanwhile the country has been economically ruined and makes the news only because of its high levels of corruption and unemployment, human rights violations, election fraud and hyperinflation.

Nyerere and Mugabe are typical examples of promising approaches in Africa that eventually failed in the chaos. The two are also part of the reason why African countries, like the entire continent, have repeatedly experienced phases of upswings and hope – but also terrible setbacks that resulted in state bankruptcy, civil wars or famines. Rarely ever did a sub-Saharan country experience a period of development that lasted so long that an educated, broad middle class, a diverse economic structure and a political culture could develop in which capable and determined governments succeeded one another in democratic change.²⁶

In the 1960s and 1970s Kenya was considered the country with the best development opportunities in Africa. The British colonists had left behind relatively good starting conditions. The transfer of power was peaceful, a legal system was established,

24 Nyerere, J.K. (1968): *Freedom and Socialism. Uhuru na ujamaa, A Selection from Writings & Speeches, 1965-1967*. Dar es Salaam: Oxford University Press.

25 UNESCO Institute for Statistics. DataCenter 2015. <http://uis.unesco.org/>

26 Devarajan, S. and Fengler, W. (2013): Africa’s Economic Boom. Why the Pessimists and the Optimists are both right. *Foreign Affairs* 68 (May/June): 68-81. <https://www.foreignaffairs.com/articles/west-africa/2013-04-03/africas-economic-boom>

agriculture flourished, the country benefited from trade relations with Europe and foreign investment. But in the 1990s this promising country experienced major setbacks under the leadership of President Daniel arap Moi. Moi, originally also a teacher and principal, remained in power for 24 years. At the end of his presidency corruption and ethnic conflict had paralysed the economy, exports had collapsed and social standards had deteriorated. In 2005 Kenya's share of world trade was half the value of the early 1980s. Between 1990 and 2002 life expectancy decreased from 57 to 45 years, also as a result of the proliferation of HIV/AIDS. The proportion of the gross domestic product dedicated to education decreased, school enrolment rates fell.²⁷

Because of such repeating setbacks, Africa also lags behind in terms of demographic development. The continuous socio-economic interplay between growing rates of education, economic development, declining fertility rates and increasing political stability, which paved the path to modernity in other parts of the world, could barely unfold in sub-Saharan countries. In 1960 the average number of children per woman in the developing world still ranked at 6.5 and the differences between Africa and countries in other, equally less developed regions of the world were very small. By 2010, however, the Asian and Latin American countries had made considerable progress so that there the average numbers of children dropped to a value of 2.6, while they still ranked at 5.1 in sub-Saharan Africa. This value has remained fairly stable to the present day, while it has been further reduced in Asia and Latin America, currently ranking at 2.2 children per woman.

Can Africa catch up on education?

In 1950 Africa had a population of a mere 230 million people, of which 180 million lived in sub-Saharan regions. The average life expectancy was only an estimated 36 years.²⁸ Around one third of the children died before they could celebrate their fifth birthday. On average only eight people lived on one African square kilometre. The low population density and accordingly low sales prospects were two reasons for global investors to ignore Africa at the time and turn to the Asian continent with then already 1.4 billion people.

Living conditions in Africa in the 1950s resembled those of medieval Europe in the time of Martin Luther. But unlike in the Middle Ages, antibiotics and other achievements of modern medicine and hygiene already existed, which also spread in Africa, albeit slowly. Up until 1970 the infant mortality rate dropped to about

27 Ng, F. and Yeats, A. (2005): Kenya Export Prospects and Problems. World Bank Africa Region Working Paper Series. <http://ssrn.com/abstract=1172344>.

28 UN Population Division (2012): *Global Population Estimates and Projections*, 2012 <http://esa.un.org/unpd/wpp/>

20 percent. At the same time the birth rate remained at a traditionally high level, or even went up, because maternal health improved and modern family planning methods were not yet available. Indeed, the average number of children per woman slightly increased between 1950 and 1970 – from 6.5 to 6.8. The population doubled in these two decades to nearly 630 million. Around the turn of the century it reached 800 million and in 2015, the number of Africans crossed the 1.1 billion mark.

But how did the economic productivity, the performance of Africans change in the face of this growth? Comparing the human capital of Africa around 1970 with the map of the Cambridge Economic History Group on literacy in Europe in 1870 (Chapter 2), it appears that the north of Europe including Germany and France was already clearly better qualified than Africa a century later. The relatively successful former British colonies were roughly on the same level of education as Italy and Spain 100 years earlier. In terms of education, in 1970 the rest of Africa was on approximately the same level as Turkey or Russia in 1870.

The education gap of more than a century explains why Africa is nowadays the least developed continent and lags behind with regards to virtually all social and economic indicators. This lag cannot be remedied in a short time. Even if, as has happened in the recent past, school enrolment rates are rising in almost all African countries, it will take several decades before these children can use their new knowledge in economically viable ways. And it takes even longer for the young and better qualified generations to replace those elders who cannot read or write. But this is the prerequisite for creating a broad human capital base, from which innovative companies can recruit their employees. Such a pool of skilled workers is also necessary for a functioning administration and a democratic political system.

The developmental lag in terms of education also explains the delayed social modernisation of Africa and the slow decline in birth rates. Again, education must prevail in broad sections of the population before significant effects will show. In 1870 Germany 80 percent of the adult population was literate,²⁹ but it took another 40 years for birth rates to fall markedly after the beginning of the 20th century. Many African countries have only just reached, if at all, this level of literacy in recent decades. It is therefore hardly surprising that the decline in fertility rates has so far been slow. This can be achieved with appropriate investments in education, as the example of Kenya shows. There, primary education had spread relatively early during and after British colonial rule. In 1970 already more than half of men and a quarter of women had attended primary school. With a corresponding delay, the

29 Broadberry, S. and O'Rourke, K. (2010): *The Cambridge Economic History of Modern Europe*, Vol.1. 1700-1870. Cambridge: Cambridge University Press.

fertility rate of 8 children per woman before 1970 was reduced to 3.9 children in the years 2011 to 2014.³⁰

Misguided policies of international donors

Even such declining birth rates nevertheless imply dramatic population growth for the coming decades. Continuous investment in education is needed to guarantee a further decline in fertility rates and give Kenya more chances for development. But particularly in terms of persistently strong governmental commitment to education as part of a long-term development agenda, Africa shows considerable shortcomings. After the spirit of optimism in the early years of independence, some early economic successes were possible. International donors such as the World Bank and the International Monetary Fund (IMF) granted extensive loans to African countries in the 1970s. Some of the money was reserved for education programmes, but most resources were just a flash in the pan. They often did not reach the schools in the countryside, were seldom invested in building up a sustainable quality education system, and did therefore not produce the human capital needed for longer-term productivity growth. Short-term development bubbles emerged, which focused mainly on big African capitals and even led to escalating budget deficits in the early 1980s.

It soon became clear that many funds that should actually have promoted development were invested in prestige projects such as presidential palaces, skyscrapers in cities or military equipment, or even disappeared into Swiss bank accounts belonging to those in power. Even though the credit programmes of the World Bank and IMF were linked from the outset to a set of conditions, the international community did not withdraw its support for new, independent states despite earlier concerns. They were expected to continue making sovereign decisions on the use of funds.

Only the debt crisis on another continent sounded the alarm in the early 1980s. At the time the countries of Latin America had spent beyond their economic means and been propelled into external debt well beyond their annual economic output. In addition, the oil crisis made this key raw material for the economies of emerging countries considerably more expensive, so that many Latin American countries had to suspend paying their debt or declare partial bankruptcy. Mexico was the first country in the region to do so in 1982. Consequently, new loans were only granted with major conditions, leading to massive reforms.

30 The DHS Program (2014): Kenya Demographic and Health Survey 2014. <http://dhsprogram.com/what-we-do/survey/survey-display-451.cfm>

To avoid such crises in the future the IMF and World Bank targeted Africa, where many countries had also accumulated high budget deficits and loan defaults loomed large on the horizon. Donors urged cuts in national budgets before they granted new loans. The decisions about where resources should be saved were left to the respective governments, which cut primarily social spending and spending on education and health. Military spending and investment in prestigious infrastructure remained largely untouched.³¹

In the wake of these so-called structural adjustment programmes, the expenditure on education in Nigeria fell from 16 percent of the budget in 1979 to only 10 percent in the budget period of 1986 to 1989. In Kenya the education budget of the years 1981-1984 shrank by 5.9 percent of the gross domestic product to 4.6 percent and in Zambia from 6.3 to 2.7 percent between 1976 and 1987.

The massive cuts meant a sharp interruption in the education of young Africans. In Nigeria, the country with the biggest population on the continent, the proportion of young women who had been to school increased from 30 percent of the birth cohorts 1950-1955 to about 60 percent of the cohorts 1970-1975. But after that the upward trend stopped and there were no improvements for subsequent cohorts. These were precisely the cohorts that were affected by the cuts in the education budget at elementary school age. A lack of education of women in poor countries guarantees high fertility rates. Not surprisingly, it was in exactly these cohorts that the average number of children per woman did not continue to decline after 2000, contrary to the general trend. This did not happen only in Nigeria: all nine African countries that experienced stalled fertility decline around the turn of the millennium went through structural adjustment programmes in the 1980s that significantly curtailed the educational opportunities of girls and young women.³²

Other African countries such as Ethiopia or Ghana also had to implement these savings programmes, but their governments decided not to cut education spending. Education continued to expand and also the decline in fertility rates continued as expected. While in Ethiopia in 1970 only about 1 percent of women had ever gone to school, today 70 percent of 15- to 19-year-old women have at least temporarily attended primary school. Ethiopia has also caught up on higher education: 15 percent of Ethiopian women have a lower secondary education, which means

31 Lutz, W. et al. (2015): The link between Structural Adjustment Programs, education discontinuities and stalled fertility in Africa. IIASA Interim Report IR-15-007. Laxenburg: International Institute for Applied Systems Analysis; Kakwani, N., et al. (1990). *Structural Adjustment and Living Conditions in Developing Countries*. Washington, DC: The World Bank.

32 Lutz, W. et al. (2015): The link between Structural Adjustment Programs, education discontinuities and stalled fertility decline in Africa, IIASA Interim Report IR-15-007. Laxenburg: International Institute for Applied Systems Analysis.

they have normally gone to school until the age of 15 years; 4 percent have even successfully completed a university education.

Although nationally the average number of children per woman is still high at 4.1, women on average had almost 7 children 20 years ago. The decrease can best be explained by better health services and a higher level of education among young women. While women without schooling almost constantly had 6 children in the period from 2000 to 2011, the birth rate declined from 3.2 to 1.5 for female with at least secondary education in the same period. Since education initially spreads in the major cities, this is where the effect on the number of children is felt first: in the capital of Addis Ababa with a population of three million, women on average have only 1.5 children. This corresponds to Switzerland's value and shows how far socio-economic development in Addis Ababa has already advanced.³³

Mozambique, that Indian Ocean country which was a Portuguese colony until 1974, had an even more difficult start. When the last colonial power in Africa left Mozambique hurriedly after a war of liberation, the lights literally went out around the country and even in the capital Maputo. There was no one who could operate the power plants. The rail system of the Portuguese lay dormant, because there was no one in the whole country who could drive the locomotives. The colonialists had deliberately kept the African population from modern education and job training. Even driving a taxi was reserved for the Portuguese.

Retrieved statistics indicate that only 3 percent of women and 16 percent of men had ever been to school. If we subtract from this class of "educated" those people who dropped out of primary school and could therefore have hardly learned anything, probably only 1 percent of women and 5 percent of men were able to read and write in 1975. Population growth was correspondingly high, catapulting the population of Mozambique from 10 million since the end of the colonial rule to 27 million by 2005.

When many international development organisations declared Mozambique a top priority country in 1975, the rebuilding of a functioning education system became their main task. The new government cooperated closely with the helpful donor countries and almost all of the public sector was externally funded. Enough teachers had to be trained, which in view of the HIV pandemic constituted a difficult task. Within the population subset of those suitable for a teaching job, infection rates

33 Teklu, H. et al. (2013): Components of Fertility Change in Ethiopia. Further analysis of the 2000, 2005 and 2011 Demographic and Health Surveys. DHS Further Analysis Reports No. 80. Calverton, Maryland: ICF International.

were still higher than among the general population.³⁴ But today the results are significant: at least 48 percent of 15- to 19-year-old women and 61 percent of men of the same age attended primary school. At the same time the fertility rate of 7 has dropped to below 5 – which is of course still an extremely high value as many girls do not go to school at all.

Education success – only on paper?

Formally, school enrolment in Africa has improved significantly in recent years. In terms of enrolment, most countries reached the Millennium Development Goals, according to which all children should be able to obtain a primary education by 2015. The United Nations even speaks of “spectacular” successes. 25 of 53 African countries had enrolment rates of 80 percent and 11 countries had reached rates of at least 75 percent by 2011. Only 11 countries such as Burkina Faso, Eritrea, Liberia and Niger, but also Nigeria, remained below these rates. But even there enrolment rates partly rose very sharply starting from a considerably low level. Overall the number of children not attending school was reduced from 40 million in 1999 to 22 million in 2011. But data are not available for all countries – there is no information for Somalia, Sudan or South Sudan, for example. This does not only reflect on the state of the local education systems, but it also means that the number of African children without access to education is higher than officially stated.³⁵

But even the positive news about rising enrolment figures should be treated with caution. Whether children go to school is one thing. Whether they actually learn something when doing so is quite another. Rapid expansion of school enrolment has frequently been achieved only at the expense of quality. Some achievements in education in African countries appear to exist only on paper.

In Tanzania, for instance, the enrolment rate is officially 94 percent. However, according to studies by the World Bank, more than 50 percent of teachers cannot be found in the classroom during school hours.³⁶ A mere 11 percent of Tanzanian teachers display the language skills necessary for practising their profession, as

34 Wils A.B. et al. (2001): *Mozambique's future: modeling population and sustainable development challenges*. IIASA Executive Summary, Laxenburg: International Institute for Applied Systems Analysis.

35 United Nations Development Programme (2014): *Assessing Progress in Africa toward the Millennium Development Goals*, New York: United Nations.

36 The World Bank (2010): *Service Delivery Indicators. Tanzania Education*. <http://www.sdindicators.org/tanzania-education/>

defined as by education experts.³⁷ Accordingly, learning outcomes are poor, as stated in a report by the East African education initiative Uwezo: less than a third of third graders have basic knowledge in reading, writing and arithmetic. Only a third of 10-year-olds can read an English paragraph from a textbook for second graders; 20 percent of the children in seventh grade do not even have the skills that would be expected in second grade. The results in neighbouring Kenya are only slightly better. They are significantly worse in Uganda, one of the countries with the highest population growth in the world. The report registers little to no improvement over time, contrary to indications by official data.³⁸

Nearby Malawi also bought alleged educational success at the expense of quality. In 1994 the local government decided to abolish the fees for the eight-year primary school, which is actually a sensible measure. Consequently, the number of primary school pupils rose from 1.9 to 3.1 million within one year – but without the government addressing the increased demand for teachers or school buildings. Later, when childrens' skills and competences were measured, it was revealed that only 40 percent of eighth graders could fully read and understand a sentence in Chichewa, the main language of Malawi. Even among high school students who had been to school for twelve years, a quarter were not able to understand the sentence.³⁹

Malawi also serves as an example of how to set the wrong priorities in education policy. The country, in which about 20 percent of 15- to 24-year-olds cannot read or write, spends a disproportionate amount of money on tertiary education. For one student, who typically comes from the Malawian upper class, the government annually invests 225 times the money that it does for a child to attend primary school. The top 10 percent of the education pyramid enjoy 68 percent of the total public expenditure on education, while the other 90 percent manage on 32 percent of the funds. Accordingly, Malawi maintains Africa's and probably even the world's most significant imbalance in favour of an elite education.

A UNICEF report which describes this dilemma also mentions the counter-example to such a policy: it can be found in Cuba, a poor country which has reached a very high level of education, ensuring educational justice at all levels. There are virtually no differences in per capita expenditure for primary school pupils, secondary school pupils or university students.

37 Devarajan, S. and Fengler, W. (2013): Africa's Economic Boom. Why the Pessimists and the Optimists are both right. *Foreign Affairs* 68 (May/June): 68-81. <https://www.foreignaffairs.com/articles/west-africa/2013-04-03/africas-economic-boom>

38 Uwezo East Africa (2013): Are our children learning? Literacy and numeracy across East Africa. <http://twaweza.org/uploads/files/2013%20Annual%20Report%20Final%20Web%20version.pdf>

39 Smith-Greenaway, E. (2015): Are literacy skills associated with young adult's health in Africa? Evidence from Malawi. *Social Science & Medicine*, 127: 124-133.

Absurdly enough, the poorest countries in the world distribute their education resources most decisively for the benefit of the rich, although the empowerment of the masses would have the greatest developmental impact. Rich countries do exactly the opposite and this is probably exactly why they are better off economically. “Ironically,” says the UNICEF report, “it is in the poorest countries that the public education sector, which should ensure a balance of educational opportunities, is the greatest source of inequality.”⁴⁰ What the report does not mention is that this policy not only entrenches the plight of the poor, but it also produces a growing number of discontented and disillusioned citizens.

The UNICEF report also criticises the huge financing gap in African education systems, for which rich countries may also be responsible. Despite the high population growth, international aid for basic education has fallen to US\$ 5.1 billion per year between 2006 and 2012, after it had been increased from 3 to 6 billion as part of the Millennium Development Goals. According to estimates, US\$ 26 billion a year would have been necessary for only the 46 poorest countries in the world in order to provide all children with a primary school education and to reach the Millennium Development Goals on education.

However, money is not the main problem. Despite the financial crisis of 2007/2008, general funds for international development cooperation continued to rise by 11 percent from 2012 to 2013. Nonetheless, young people could not benefit from this, because the spending for basic education was reduced by 7 percent over the same period.⁴¹ Overall, only 2 to 4 percent of international aid is invested in basic education, which lays the foundation for any development.⁴²

At the other end of the education spectrum, sub-Saharan countries display developments that seem, at first glance, to be great successes, but a second glance changes this view significantly. Between 2000 and 2010 the number of students doubled to over 5 million and increased to 6.6 million by 2013; 7 percent of all 18- to 23-year-olds obtained a university degree. But this success has to be compared to the global average, where students make up 29 percent of the population. In addition, the 6.6 million African students have to be seen in relation to the population growth in this age group. Between 2010 and 2030 it will increase by 50 million to

40 UNICEF (2015): *The Investment Case for Education and Equity*. New York: UNICEF.

41 Steer, L. and Smith, K. (2015): It's Time to Reverse Declining ODA to Education. Brookings. Education + Development. <http://www.brookings.edu/blogs/education-plus-development/posts/2015/01/12-overseas-development-assistance-education-steer>

42 UNICEF (2015): *The Investment Case for Education and Equity*. New York; OECD Development Centre Data Base (2015). http://www.unicef.org/publications/files/Investment_Case_for_Education_and_Equity_FINAL.pdf

150 million young people. Furthermore, there is still a strong gender imbalance among students: only a third of all university students are women.

Additionally, obtaining a university degree in Africa does not necessarily mean that the graduate will have gained an internationally recognised qualification. Most African universities have major shortcomings: teachers are poorly trained and lack pedagogical skills. There is a lack of classrooms, libraries, laboratories and research facilities. Therefore, many graduates do not possess the skills necessary to succeed in the private sector. Employers confirm that there is a big gap between the demands of the daily work life and the skills of young graduates. This is one reason for the high unemployment rate among academics in Africa, which in turn leads to great dissatisfaction and social tensions. In Kenya, for example, university graduates spend on average five years searching for a job before they find adequate employment.⁴³

Despite all the progress, there are difficult times ahead for the 2 billion children who will be born in Africa until 2050. Most of them will need education and employment by then. Today already 11 million young people on the continent reach employment age every year, while only 3.7 million new, paid jobs have been created annually in recent years.⁴⁴ In addition, three out of ten children live in conflict zones or areas that are prone to conflict.⁴⁵ Classes are frequently cancelled or schools are closed completely.

In 2050 Africa will be home to 37 percent of all under-18-year-olds in the world. These are the young people, in absolute terms around one billion, who will be decisive for the future of humanity. Under favorable conditions they can pave the way to a bright future – in the worst case, they represent the greatest potential for unrest on the planet.

India – a continent in itself

When it comes to the state of education and its impact on the future of humanity, there is one country we cannot ignore and which will soon be the most populous in the world: India. It is home to 1.3 billion people, more than the entire African continent. Because the population is still growing strongly – unlike in China – it could reach 1.7 billion in 2050.

43 British Council (2014): Can higher education solve Africa's job crisis? Understanding graduate employability in Sub-Saharan Africa. https://www.britishcouncil.org/sites/default/files/graduate_employability_in_ssa_final-web.pdf

44 Population Reference Bureau (2013): Creating Jobs: Challenge for a Demographic Dividend. In: *Africa and the Demographic Dividend*. Washington, DC: Population Reference Bureau.

45 UNICEF (2014): *Generation 2030 Africa*. New York: UNICEF.

Economic experts predict a golden future for India, where the probability of success is much higher than in Africa.⁴⁶ India does not compete with Africa, in any case, but with its neighbour China. Both represent about a fifth of the world population. Both have risen from former developing countries to powerful emerging countries and will soon become industrialised nations. Both countries have nuclear weapons, their own space programme and command the largest armies in the world. But there are also important differences: China is the locomotive of the world economy, which India is still striving to become. In all major areas, including health, life expectancy, (declining) poverty rate, environmental policy, standard of living and political stability, China is clearly ahead. China's economy is five times larger than that of India.⁴⁷

While the differences between rich and poor and between urban and rural have been partially eliminated in China, the wealth gap in India is extreme. While poverty rates are declining in rural and also urban areas by the year, a third of all Indians still live in extreme poverty, i.e. less than the equivalent of US\$ 1.25 a day; 17 percent of the population are considered malnourished.⁴⁸ They are matched by some 100 billionaires who have earned their money with Indian global companies in industries such as petrochemical, pharmaceutical, information technology, steel, construction, telecommunications, banking and media.⁴⁹ On the Human Development Index, the multidimensional development indicator of the United Nations, India is ranked 130th out of 188 countries surveyed, while China is ranked 90th.⁵⁰

India may catch up with China only if it is possible for the country to capitalise on its young population, which involves educating them well. In this respect India is far behind, despite substantial achievements – despite the growing service sector, the booming IT industry with over 3 million employees and its global technology scene in Bangalore, the Indian Silicon Valley.

46 Asian Development Bank (2015): Asian Development Outlook 2013. Financing Asia's Future Growth. <http://www.adb.org/publications/asian-development-outlook-2015-financing-asias-future-growth>

47 Lee, Y. and Mellor, W. (2015): India rising, China slowing does not mean Modi wins. *Bloomberg Business*. <http://www.bloomberg.com/news/articles/2015-06-16/india-rising-china-slowing-doesn-t-necessarily-mean-modi-wins>

48 United Nations Development Programme (2014): *Human Development Report 2014, Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. New York: United Nations.

49 Forbes (2015): The Forbes List Files. India's 100 richest people. <http://www.forbes.com/india-billionaires/list/#tab:overall>

50 United Nations Development Programme (2015): Human Development Index. <http://hdr.undp.org/en/content/human-development-index-hdi>

India's backlog is rooted in its past, characterised by a long tradition of education for small elites of the upper castes, while the lower castes were excluded. The Indian caste system divided society by birth hierarchically into different groups and determined, among other things, which occupations people were allowed to pursue or whom they were allowed to marry. Officially and legally, the caste system has no influence in India today, but in everyday life the social distinctions still play a role. This is especially true for the "pariah", the "untouchables" or "unclean", the members of the lowest castes, with whom no Brahmin from the upper caste would sit at table in rural areas.⁵¹

Traditionally, only boys of the upper class of the Brahmins were taught reading, writing, metaphysics and mathematics by gurus. The British colonial administration even promoted the elite system by hiring only academically trained people for the administration, so almost exclusively Brahmins. Only in the 20th century could individual members of other castes climb up the social ladder through better education. Because of the the protracted democratisation of its education system, India still has the world's highest number of illiterates today: 264 million people over 15 years cannot read or write, 176 million of whom are women.

In the 1950s and 1960s India's population grew extremely rapidly, with fertility rates of nearly 6 children per woman. By 1970, i.e. more than 20 years after independence, 82 percent of women and 54 percent of men still had no education. The level of education changed slowly. According to the results of the 2001 census, 42 percent of adults were still illiterate.⁵² In 1970 only 4 percent of all men had a university degree; by 1990, it was already 8 percent and today the percentage of university graduates is 13 percent. Women also took advantage of easier access to education: 7 percent now have a college degree. In parallel, the number of children per woman has fallen to 2.3. But here too the past still matters: 46 percent of adult women, mostly from older age groups, have never been to school. In hardly any other country in the world are educational opportunities so unevenly distributed.⁵³

The steadily improving level of education – but compared to China it is still low – explains much of the economic differences between the two mega states. In China the illiteracy rate among adult women is a low 5 percent. Virtually all children from all backgrounds go to school and 16 percent of men and women under 40 years old now have a college degree. Since younger cohorts are clearly better qualified

51 Ambedkar, B.R. (2011): *Castes in India*. Charleston: Nabu Press.

52 Cheney, G.R. et al. (2005): A profile of the Indian Education System. http://www.teindia.nic.in/files/articles/indian_education_sysytem_by_karthik_murlidharan.pdf

53 Wittgenstein Centre for Demography and Global Human Capital (2015): Wittgenstein Centre DataExplorer. <http://www.oeaw.ac.at/vid/dataexplorer/>

than their parents, the entire level of education of the Chinese workforce – and thus probably its country’s economic performance – will continue to rise further.

Nevertheless, there is much evidence that India is catching up with China to a certain degree. Above all, demographic dynamics play a role: the world’s largest democracy has a much younger population, with a median age of 28 years compared with 37 years in China. China’s population under 65 years (generally those in paid employment) has been declining since 2013 as a result of the one-child policy, while it has been growing for many years in India.

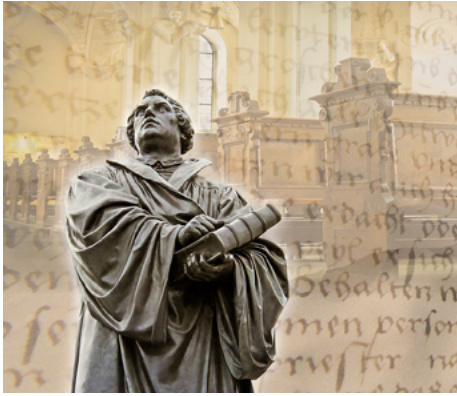
It is quite possible that the expected change in the relative weights in Asia is already reflected in recent economic data. After 30 years of economic growth, with average growth rates of 10 percent, China will now necessarily face some levelling off in growth rates, while India, if all goes well, can still look forward to the boom. In terms of economic growth, India overtook China for the first time in 2015 and forecasts indicate that this gap will become permanent.⁵⁴

If the current Prime Minister, Narendra Modi, manages to prepare the young Indian population for the future, they could develop their potential for a strong India. In fact, he has (unlike most African leaders) already set clear and achievable goals for his country. He wants to have created 100 million new jobs by 2022 in India. That is significantly higher than the number of young people who will enter the labour market in the same period. And he wants to provide these workers with the necessary training. Modi has already impressively demonstrated his capabilities as Prime Minister of the flagship state of Gujarat. In the three sectors of agriculture, services and industry Modi placed Gujarat on a path of rapid economic growth and built up a broad training programme for young professionals. Modi sought close contact with the population and encouraged families in education campaigns to take their fate into their own hands and send their children to school.⁵⁵

India’s biggest challenge remains that many people have not yet benefited from the education revolution and are still marginalised. Closely related to this are the great social differences within the population, the tensions between the religious communities and, last but not least, the large disparities between the highly developed southern states and the particularly poor states like Bihar and Uttar Pradesh, where social conflicts regularly flare up with the potential of spreading further. Again it is the poor, already fragile areas where the population is growing the fastest and where the numbers of people with little or no education could rise again.

54 Lee, Y. and Mellor, W. (2015): India rising, China slowing does not mean Modi wins. *Bloomberg Business*. <http://www.bloomberg.com/news/articles/2015-06-16/india-rising-china-slowing-doesn-t-necessarily-mean-modi-wins> cf. footnote 194

55 Prime Minister’s Office (2014): *Narendra Modi. Governance Track Record*. <http://www.pmindia.gov.in/en/governance-track-record/>



6

NOTHING BUT BENEFITS

Six strong arguments for education

The examples of successfully rising countries from Finland to China, but also the problems of those nations that suffer under massive education deficits, provide convincing arguments that education is of great benefit for society at large. Hardly anyone in the industrialised world would classify education as useless or superfluous. That education is a prerequisite for a successful working life and that wellqualified people are the foundation of a functioning state that we all benefit from seems, in essence, a truism.

The advantages of education are so manifold that it is hard to identify disadvantages. The late American economist and Nobel Laureate Gary Becker once said he could imagine no area of life for which he would rather be less educated than more educated. Becker is considered the father of behavioural economics and the inventor of the term “human capital”, and worked on the question of the significance of education and science for the success of economies. His findings on how education is the key to human development are part of basic economic knowledge today.

Amazingly, though, education does not enjoy the importance it deserves in politics, even in many industrialised countries. This also applies to the aid provided by rich countries for international development cooperation in the poor part of the world: a mere 2 to 4 percent of the total development assistance goes to basic education.

To make the case for giving priority to education, this chapter describes six aspects that show the concrete benefits of education for each individual and for the community as a whole. On the personal level, this involves better health, higher incomes and subjective life satisfaction. At the social and communal level, education helps to reduce dangerous population growth in less developed countries, makes it easier for people to adapt to already unavoidable climate change and helps to advance democracy.

All these benefits of education can only materialise if governments stop neglecting the education sector. Where political leaders do not care much about the skills and empowerment of citizens through education or – even worse – where fanatical enemies of education prevent young people by force from gaining access to knowledge and education, affluent societies simply cannot arise. None of today's terrorist groups, from Boko Haram to the so-called Islamic State, has any concepts of, or ways to build, an alternative education culture. They are just against education and therefore create no new knowledge and no basis for development. They lack the stability that would be attractive to investors. They only distribute what they capture, they extort protection money as in the Middle Ages and they do not create innovative firms or research centres. They also do not invent a climate-friendly energy supply, develop new drugs or vaccines. They have no concepts to address the challenges of the 21st century.

Before we turn to the six aspects in detail, let us first address the question that is always asked in all discussions on education: What came first – better education or economic growth?

Chicken or egg?

We argue in this book that basic education of large parts of the population is a necessary precondition for the economic advancement of today's societies, and that modernisation, democratisation and the necessary restructuring of our modes of production towards sustainability are not possible without the education of broad segments of the population. Of course, education is no guarantee of success, but it significantly increases the chances of success. Without education development is not possible. We therefore believe education is a necessary though not always sufficient precondition for social and economic development.

This proposition is not universally accepted. Some development economists believe that education is primarily a consequence of economic success. In their opinion, education is something that parents will purchase if they consider it useful and only once they have the means to do so. In this view, prerequisites for the expansion of education are economic growth and a structural change in the economy that makes education pay off. The expansion of education would therefore be a consequence rather than the cause of modernisation, as claimed here.

Why is this an important question? The answer to this question about what is cause and what is consequence matters greatly for setting development policy priorities. Either the focus is on building schools and making sure all children get quality education with the expectation that economic development will follow – or the focus is on pushing GDP growth and contributing to household income, expecting that this will also result in more and better education. This is also related to the rather fundamental question of whether education is primarily seen as investment or as non-essential consumption.

At first glance, when looking across all countries in the world, economic growth, social modernisation and progress in education seem to go hand in hand. The picture changes, however, when we look at time series and the timing of the changes in income and education. This can help to sort out the question of causality by the fact that the cause must necessarily precede the effect. Causality can hence be concluded from examining the temporal sequence of both phenomena. In other words, either the economy is flourishing before school enrolment increases, or education spreads before the economy grows.

In the latter case, there must even be a longer time lag between the two changes. If the proportion of children attending school increases because the government is expanding the education system, it will take around two decades until the children become economically active adults equipped with the skills and knowledge they learned at school. Only then can an economic gain from earlier investments in education be expected. At the very beginning of the process, when more children go to school, the economic effect can even be negative, because schools cost money and children can no longer help their parents with farming, for example, but must temporarily spend “unproductive” time in the classroom.

In all the cases described above, in the development of Finland or Japan, on the island of Mauritius, South Korea, Singapore and China, the expansion of primary education, the expansion of schooling for broad sections of the population, took place well ahead of the acceleration of economic growth. This also applies to virtually all other countries for which data over time are available. Accordingly, government officials had to invest in mass education first in order to later reap the fruits of their

investments. In almost no case could they wait for certain other factors to boost economic growth and hence fund the dissemination of basic education. The only exceptions to this rule are those countries where economic growth resulted from the exploitation of raw materials, most notably oil. These countries did not have to develop economic growth drawing on their own human capital. But they are highly vulnerable, because their income depends entirely on the commodity prices and the remaining reserves of the raw materials. While the global expansion of higher education is more interwoven with economic growth, the empirical evidence for a temporal sequencing is clearest for basic education. Global statistical analyses across all countries show that broad-based primary and junior secondary education is a key factor contributing to taking countries out of poverty. The histories of Finland in the 19th century and Mauritius or China in the second half of the 20th century clearly show that poor countries can afford this investment without external help. Under these conditions primary school teachers do not earn much and even simple school buildings and learning materials are easy and cheap to obtain. But the political will for doing this is indispensable.

With the spread of higher education, however, we can discern a closer relationship between economic development and progress in school attendance – typically, a positive upward spiral develops: the more children attend primary school, the more young adults can later escape extreme poverty. These people invest their modest prosperity in part in the expansion of their own secondary and higher education. Governments can use tax revenue for investment in education. This makes society as a whole more productive and accelerates economic growth. If there is, in addition, a stable political situation and companies can find good investment conditions, the demand for goods and services will rise and foreign trade develops; so the upward spiral will lead to increased demand for higher education. Research centres develop and the economy can grow as fast as was the case with the East Asian tigers.

The understanding that there is a time lag of about 20 years between the expansion of basic education and the possible economic effect is essential for understanding the relationship between education and development. It also explains why it is often difficult for policy makers to provide the necessary resources for education. Because of the time delay, the politicians most of the time experience the costs of education slowly during their term in power, but rarely get to enjoy the fruits of their efforts, which will be so important in the long run.

How education changes our brain and our behaviour

The clear temporal sequence between education and economic growth provides a strong argument for the economic benefit of education – at least on the so-called

macro level, i.e. at the level of development of countries and societies.¹ Equally important is the micro level, i.e. the question of how education affects individuals, what impact it has on their minds, their behaviour and their chances of survival. What happens when we learn, what does learning change in us and in our brain, the most important organ for education?

Modern brain research has made it possible for several decades now to track and physiologically explain (partly) every act of information recording, down to the level of molecular processes. The brain is constantly bombarded with a wealth of information received through the five senses. Without ordering these impressions, total chaos would ensue. Our brain must therefore first select important from unimportant information and then save it in different places. Therefore, we forget – fortunately – most of the thousands upon thousands of perceptions we register per day.

The brain tries to filter out and order key information, and store those pieces that might be relevant for the future. This is particularly true for information that generates the associations we have encountered in one way or another before. In a crowd we recognise those we have already met at some point and remember this encounter, but we forget strangers from that crowd. Evolution has made our brains so complex that we can improve our future by learning from past experience.

Every experience leaves traces in the nervous system. Explained in an abbreviated and simplified way, simultaneously activated neurons are connected through synapses. The more often certain experiences are had, the more previously used synapses are stimulated and the more easily these connections can be stimulated in the future. A single nerve cell can connect with hundreds of other neurons, so that neural networks are formed. These are a reflection of our learning experiences over time. The more and the larger networks we have, the faster and more easily we learn and the better we can retrieve stored information.

Hence we can, for example, remember phone numbers, facts and correlations more easily when we experience them repeatedly. This process is facilitated when the context changes with the repetition. So telephone numbers can be better memorised after the first reading by singing the numerical sequence or reciting it backwards. Such so-called mnemonic strategies are useful to remember new knowledge. Strict and dull repetition or learning by heart, on the other hand, hardly leads to new neuronal connections.

Arithmetic is best learned by children through things they are confronted with in everyday life and that are important to them, not by adding or multiplying. Students

1 Lutz, W. et al. (2008): The demography of educational attainment and economic growth. *Science*, 319, (5866): 1047-1048.

who have few learning experiences, who are only exposed to teachers' lectures, learn material doggedly by heart and do not (get to) ask questions will miss significant cognitive development steps that can hardly be compensated for later. Challenging activities change our brains up until old age. Specialisation also leaves physical traces. Hence, certain areas grow in the brains of musicians when they play a lot on an instrument. Furthermore, the energy consumption of the brain decreases during an activity which we exercise often and routinely.² The more we use our brains, the easier it becomes to remember.

If a piece of information strikes us as important, it is transferred from short-term into long-term memory, a "memory consolidation" takes place. There the information stored remains available until it is needed. Information that we perceive simultaneously through multiple senses – for example, we hear, see and experience it (such as an experiment in a chemical laboratory which stinks and crashes!) – is consolidated particularly strongly.

Eric Kandel, a native of Vienna who worked as a neuroscientist at Columbia University in the USA and was awarded the Nobel Prize in Physiology or Medicine in 2000 for his pioneering research in the field of memory, sometimes concluded his lectures with the following remark: "Let us repeat this context for a third time. In the third repetition, new synapses will have formed in your brain permanently. And if you now exit through this door, you are physically a different person than when you entered."³

The brain is thus a mimetic reflection of a person, because it is influenced by personal impressions and learning experiences that are unique to each person. Information recording and learning do not only leave tracks in our brain, but also change it substantively. The neural pathways and networks generated by learning are not only the basis of our ability to remember, but the basis of our consciousness and our identity. All our perceptions are classified by these brain structures that are built up over the years, which then decide our further reactions. Even identical twins, who grew up with the same genetic blueprint, have physically different brains as a result of their different experiences.⁴ Learning literally turns us into different people.

All learning processes which change the structure of the brain, such as repeating contexts, understanding abstract signs and dealing with mathematical formulas, increase our cognitive abilities and thus our own private human capital that cannot be taken away from us. This capital is an essential foundation for personal and

2 Elbert, T. et al. (1995): Increased cortical representation of the fingers of the left hand in string players. *Science*, 270 (5234): 305-307.

3 Wolfgang Lutz, personal communication.

4 Kandel, E. (2007): *In Search of Memory*, New York: W.W. Norton.

business success in our lives, for our health, for our place in society. And the more people qualified in this way who work together in a society, the more successful it can be.

That the sum of individual skills, i.e. the human capital of a society, can have an enormous economic effect was already determined by the French demographer Alfred Sauvy (1898-1990) more than half a century ago. He analysed why the newly founded Federal Republic of Germany, a country badly bombed during World War II and that had to accommodate around 5 million destitute refugees from Eastern Europe, did not fail but was headed for an economic miracle: “These people came without any means, but with their knowledge and skills. They worked and created the capital that they lacked because among them were enough engineers, mechanics, chemists, doctors and sociologists. If instead five million unskilled workers had come to West Germany, there would have been five million more unemployed people.”⁵ The same applies to the 1.8 million mostly young, qualified citizens of the former GDR, who emigrated to the West after the end of the Cold War, where they contributed decisively to economic growth. Even with the current wave of refugees to Europe, it is their level of education in particular that will decide how well and how quickly they can integrate and make themselves economically useful.

Aspect No. 1: Education improves health

The personal benefits of education are particularly evident in health, which is by definition especially important to humans. Surveys regularly show that health and a long and healthy life are high on the list of things that people want for themselves and their loved ones: everyone prefers to be healthy rather than sick. This applies to the stockbroker in New York as well as to the farmer in Mali or the native tribes in the Amazon rainforest.

Epidemiological data from numerous studies show that better educated people in all countries of the world can fulfil the desire for a healthy and long life better than people with less education. Similarly, health and life expectancy are best (or highest) in those countries which also have a good level of education. In a meta-analysis, in which the results of numerous large studies were evaluated, scientists statistically analysed the question of the relationship between education and health and thus produced a global comparison of more than 20 million people.⁶ The result: people who attended school only up to the lower secondary level, i.e. up to the age of about

5 Sauvy, A. (1958): *De Malthus a Mao Tse-toung: Le probleme de la population dans le monde*. Paris: Denoël.

6 Baker, X. et al. (2011): The education effect on population health: A reassessment. *Population and Development Review*, 37 (2): 307-332.

15 years, had at any adult age a mortality rate that was on average 46 percent higher than the mortality rate of those who attended school for a longer period.

In all countries for which appropriate data are available, people with the highest level of education (university degree) live between two to twelve years longer than their fellow countrymen and women who only attended primary school or had no schooling at all. It seems that people who received even more education live even longer – professors who are also members of the Academy of Sciences. The Vienna Institute of Demography examined the mortality data among members of various academies and compared them to the total male population (the deceased members of academies are almost exclusively men, because they were educated at a time when women were still discriminated against in education).⁷ It was found, for example, that in Austria, the years of life that remain for a man aged 60 years are 20 years for the overall population, 23 years for men with a university degree and 26 years for members of an academy. The most plausible explanation for this is that those people who remain mentally and socially active into old age will live longest, because they continue to research, read and discuss, and so keep their education fresh and up to date for as long as possible.

Considering the differences in life expectancy between poorly and highly educated groups in various countries, it was found that they differ by only two to four years in European Mediterranean countries. This is probably related to the healthy Mediterranean diet, which is also enjoyed by the lower strata of society. The biggest difference are found for men in Eastern Europe. Well-educated Russians live on average more than twelve years longer than poorly educated Russians.⁸ This in turn is related to the frequently risky lifestyle adopted by men with a low level of education, with excessive alcohol consumption and consequent health problems, accidents and acts of violence. An unhealthy lifestyle contributes to the fact that half of Russian men die before they reach retirement age.⁹

In many countries the differences in life expectancy in the various education groups have even increased in recent years and are more significant in men than in women. This points to a split in society. It is above all socially disadvantaged men who will live a shorter life. In the USA it is African-Americans who are most frequently affected. They fail in their educational careers, have to work in poorly paid jobs or remain unemployed and barely interested in health prevention. Today people in the USA

7 Winkler-Dworak, M. (2008): The Low Mortality of a Learned Society. *European Journal of Population*, 24: 405-424.

8 Caselli, G. et al. (2014): Future mortality in low mortality countries. In: *World Population and Human Capital in the 21st Century*, Lutz, W. et al. (Ed.). Oxford: Oxford University Press.

9 Vallin, J. et al. (2005): Geographic diversity and cause-of-death patterns and trends in Russia. *Demographic Research*, 12/13: 323-380.

with less than twelve years of school/university education have a life expectancy that is comparable to that of the entire population half a century ago. So they have hardly benefited from the improved quality of life over the last 50 years.¹⁰

Why does education make us healthier?

The main reasons for the positive impact of education on health are a more self-aware lifestyle and changes in risk behaviours. Both directly affect everyday life. On average, better educated people engage more in sports and smoke less. If they smoke, they more easily quit for rational reasons. They drink alcohol in hazardous quantities less often and consume fewer illegal drugs. Usually they eat healthier foods and the likelihood that they will suffer from obesity is significantly lower. They have more social contacts and are on average more likely to feel that they can control their own lives. Better educated people find easier access to medically relevant information and services, and it is easier to convince them of the necessity of preventive health care.

Less educated people must hence expect more health problems in their daily lives. At any age between 30 and 75 years health problems occur on average three to four times more frequently in the less educated group than in the best educated group.¹¹ That this will affect the wellbeing of people is also reflected in the subjective perception of their health status. In the Austrian Health Survey 88 percent of women with a high school diploma answered that they feel very good or good when it comes to their health; for women with merely compulsory education the rate was a low 59 percent.¹²

Better educated people are also more likely to accept new information about health-relevant behaviour. Smoking as a social mass phenomenon, for instance, was a fad that emanated from the USA and was later copied all over the world. In the 1950s the United States had the world's highest levels of cigarette consumption.¹³ It was the wealthy and better educated people who established this trend. But they were also the first who changed their behaviour for rational reasons, as the health dangers of smoking were scientifically explained. Today, smoking in developed countries is mainly a habit of low-skilled people.

10 Olshansky, J. et al. (2012). Differences in life expectancy due to race and educational differences are widening, and many may not catch up. *Health Affairs*, 31: 1803-1813.

11 KC, S. and Lentzner, H. (2010): The effect of education on adult mortality and disability: a global perspective. *Vienna Yearbook of Population Research*, 8: 201-235.

12 Statistics Austria: Austrian Health Survey 2006/07, <http://www.jpi-dataproject.eu/Home/Database/179?topicId=9>

13 Caselli, G. et al. (2014): Future mortality in low mortality countries. In: *World Population and Human Capital in the 21st Century*, Lutz, W. et al. (Ed.). Oxford: Oxford University Press.

How much education affects our risk behaviour can also be observed in the AIDS pandemic. Initially, it was the affluent and well-educated people of the upper classes who were more likely to be infected by the spread of HIV through its region of origin in Africa in the 1980s. They were highly mobile across continents and had a higher probability of coming into contact with the virus. But they were also more ready to change their risky behaviour than others after information about transfer mechanisms became available and are thus nowadays less affected by HIV infection than the poor and less educated.¹⁴

Health is of course also a question of money. In Germany, for instance, people from the lowest income group, i.e. who earn less than 980 euros net per individual per month, live about ten years less than those who make at least 2,450 euros, thus falling into the highest income group. Poor people cannot afford high-quality food, they often have to do physically demanding work and they do not, despite national health care, enjoy the same access to health services as rich people. In addition, poor people are more worried about the general quality of their existence – which in turn affects their health negatively. Numerous international studies demonstrate a clear link between social conditions and health.

But do poor people actually live shorter lives because they are poor, or are there other reasons for their poor health? Researchers at the Robert Koch Institute in Berlin tried to determine the most significant factors affecting health or disease are. They came to the conclusion that a person's financial situation plays a minor role and that education has a far greater impact.

The study furthermore reports a positive effect for the number of real friends a person has. How big and reliable the circle of friends is – and hence how low the risk of becoming lonely in old age – is in turn closely linked to the level of education. Even with regards to cancer mortality, education plays a prominent role. This is because better educated people smoke less, are physically active and are less often morbidly obese.¹⁵ The enormous increase in life expectancy – in countries such as Germany, it has risen for a long time by two to three years per decade – is thus largely based on the massively increased level of education of large parts of the society.

The impact of education on health can also be shown with a simple medical test: the so-called “hand-grip test” measures the power of the handshake, or how strong a person can squeeze an object in the laboratory with their fingers. This grip

14 Sanderson, W. (2004): Interactions between education and HIV: Demographic examples from Botswana. In: *The End of World Population Growth in the 21st Century: New Challenges for Human Capital Formation and Sustainable Development*, Lutz, W. et al. (ed.). London: Earthscan.

15 Lampert, T. and Kroll, L. (2014): *Social differences in mortality and life expectancy*, GBE kompakt 5(2). Berlin: Robert Koch Institute.

strength is a sign of health and vitality and provides a good perspective on future life expectancy and the risk of suffering a heart attack or a stroke in the next few years.¹⁶ The amazing thing is that after a certain age rather weak seeming intellectuals often outperform simple workers of the same age, who were steeled by their craft. According to one study, an average, poorly educated 60-year-old white man in the United States displays a hand-grip strength comparable to that of a 66-year-old better educated man.¹⁷

Children benefit from educated mothers

Sound education is an important advantage for personal wellbeing in developed countries. In poor countries the impact of education on health and the duration of life is even greater. There people without adequate education are especially vulnerable, because the risks to life are much higher than in the developed world. Medical care is often inadequate and people frequently drink contaminated water. In some places poverty, hunger and civil war prevail. Under these circumstances knowledge and education not only contribute to improving health – they can be decisive for life and death. When mothers know that drinking boiled water protects the little ones from deadly diarrheal diseases, childrens' lives will be saved.

For newborns the probability of survival significantly depends on how long the mothers went to school (the education level of the father plays a lesser role in this respect). This is evident from the demographic and health surveys which are carried out in many developing countries. The surveys ask a larger number of women about the number of their births, their level of education and health, or the death of their children. In all countries children of better educated mothers die significantly less often before their first or fifth year. In most countries the probability of survival of the little ones increases linearly with the education level of women. If they graduated, their children will have the lowest mortality. If they never went to school, the children will more likely face an early death.¹⁸

When the scientists examine the impact the income or the wealth of families has on child mortality in similar analyses, they find a significantly lower effect. Studies in which scientists split women into four groups are particularly interesting: “little education / poor”, “little education / rich”, “educated / poor” and “educated / rich”. As expected, the children of less educated, poor women have the worst chances,

16 Leong, D. et al. (2015): Prognostic value of grip strength: findings from the Prospective Urban Rural Epidemiology (PURE) study. *The Lancet*, 386 (9990): 266-273.

17 Sanderson, W. and Scherbov, S. (2014): Measuring the speed of aging across population subgroups. *PLOS-One*, 9 (5): e96289.

18 Pamuk, E. et al. (2011): Comparing relative effects of education and economic resources on infant mortality in developing countries. *Population and Development Review*, 37: 637-664.

while those of educated and wealthy women have the best. These are the two largest groups in society also because of the usually positive correlation between education and income. The two other smaller groups provide the most surprising results: in almost all countries there is a pattern similar to that in Indonesia, where the children of wealthy but poorly educated women face a nearly 50 percent lower probability of survival than the children of poor but better educated women. The same results can be observed in Malawi in East Africa, where the infant mortality rate is in total much higher than in Indonesia. In both countries education ensures that even the children of poor mothers have better chances of survival.¹⁹

No matter with which method or statistical approach such analyses are carried out, no matter if one compares better or worse educated women,²⁰ villages whose populations have different levels of educational attainment or entire countries. The relationship holds across the board: the education of mothers consistently has a greater impact on the probability of children's survival than income or wealth. Human capital is more valuable than financial capital.

With respect to individual villages, even children of women with low levels of education have a higher probability of survival when many women with higher levels of education live in the same place. Scientists call this a spill-over effect: apparently the health-promoting behaviour of better educated women influences other less educated women. If it is good for the kids, word gets round. Again, no positive effect of income on health could be discerned. If many wealthy families live in a village, this has no impact on the infant mortality rate of the poor in the same village. The wealth of some does not lead to the wellbeing of others.

Why is that? Why will even a few years of schooling of future mothers make their offspring healthier? Most certainly the use of written language, numbers and simple learning content suffices to promote abstract thinking. Barely tangible relationships such as “the boiling of water kills dangerous germs in it” become easier to understand. Irrational ideas of spirits and dark forces that might infect the child become less acute. Women with a basic education can more easily communicate with doctors and nurses. They can read and understand the instructions on medical packaging. Campaigns for sex education and family planning are more easily accepted by them. They understand more readily why the child has health problems and follow the instructions given by the medical staff. They understand medical correlations and use them to their own and to their children's advantage.

19 Fuchs, R. et al. (2010): Education or wealth: which matters more for reducing child mortality in developing countries? *Vienna Yearbook of Population Research*, 8: 175-199.

20 Pamuk, E. et al. (2011): Comparing relative effects of education and economic resources on infant mortality in developing countries. *Population and Development Review*, 37: 637-664.

Aspect No. 2: Education has positive effects on income

Every additional year that a person spends in training gives them a higher income. This does not apply to every single case, as evidenced by the taxi-driving social scientists or art historians in every major city in the Western world. There are people who undergo expensive training, but will not find employment in their field. Even where a lot of money flows into private schools or tuition for second-rate universities, the effort is not always justified by higher earnings.

But there is definitely a relationship between education and income – and that is key for each analysis and for each strategy – on average. Statistics from all countries show that education statistically increases personal income, both in the poorest developing countries and in the most industrialised ones. This is true even for the countries of the southern EU crisis states where unemployment has recently increased among young academics. There, too, statistics show that the better educated are better protected against job losses and that when they have a job, they earn more than those with less education.²¹

This so-called return on education investment is especially strong in the United States. Currently every year spent in college provides on average 15 percent more income for the rest of one's life, compared with the income of those who did not attend college. So if one studies for four years, one can expect an increase of 60 percent in income.²² In Europe, too, a university degree makes a noticeable financial difference. OECD studies show that in Germany a college degree results in an income that is 20 percent higher compared to the income of a person with a high school degree; in France and Italy it is almost 30 percent higher.²³

The difference is even more pronounced when comparing people without professional training with academics. Data from the German Federal Employment Agency show that people with a university degree (in continued employment) will reach a life income of 2.3 million euros on average, but those without qualifications only 1.1 million – even though academics can only begin to earn money on average seven years after having started their university education. In reality the difference is even greater, because those with low levels of education retire earlier than the better

21 Malik, K. (ed.) (2014): Reducing vulnerability in critical life course phases by enhancing human capital. In: *Safeguarding Human Progress: Reducing Vulnerabilities, Building Resilience*. New York: UNDP.

22 Goldin, C. and Katz, L.F. (2008): *The Race between Education and Technology*. Cambridge: Harvard University Press.

23 OECD (2008): *Education at a Glance. OECD Indicators*. Paris: OECD.

skilled. They are more frequently unemployed and enjoy continuous employment less often, and thus have lower pension entitlements.²⁴

The World Bank recently examined 140 economies to determine whether investment in education pays off to the same extent all over the world. The question of whether there is a return on education is especially important for governments and individuals in poor countries. Because if education uses more money than it produces, then resources should better be invested in other important areas, such as construction of roads and housing, agriculture and healthcare. For individuals the money spent on education must, economically speaking, provide a higher return than other forms of investment, such as equity funds or bonds.

The result of the World Bank study is clear: in the world average, every year spent longer at school or university has a 10 percent return – a percentage hardly achieved by any financial investor. Four years more schooling hence mean 40 percent more lifetime earnings. The highest levels of educational yield with an average of 13 percent per year of additional training can be observed in the sub-Saharan countries, i.e. the poorest nations of the world. In Rwanda, South Africa and Ethiopia, it is even 19 to 22 percent, while women generally score higher than men. Here, too, a disproportionate profit through investment in education in women can be discerned.

The lowest returns on education are found in North Africa and the Middle East, in countries such as Afghanistan or Iraq, where it is a mere 2 to 3 percent. In these countries social advancement depends more on corruption and nepotism than on qualifications. Because of poor governance and management, there is a lack of jobs for qualified workers, and women are discriminated against despite good education in many areas of the labour market.

Interestingly, the return on education becomes higher with each additional year of higher education. This means that an additional year at university yields more for one's wallet than an additional year of primary school. It is not education alone, but the best possible education for as many members of society as possible, that is therefore crucial for economic success. However, the yield decreases when more and more people have a good education. In fact, the education and training time of all over-15-year-olds of the world's population extended from five to eight years between 1980 and 2010. Like other agents in a market economy, education responds to the price: the more well-trained people enter the market, the lower the profits will be for each individual. Nevertheless, the bottom line is positive: while education

24 Schmillen, A. and Stüber, H. (2014): Lebensverdienste nach Qualifikation: Bildung lohnt sich ein Leben lang. IAB Kurzbericht 1/2014. Nürnberg: Institut für Arbeitsmarkt- und Berufsforschung, <http://doku.iab.de/kurzber/2014/kb0114.pdf>

levels have risen sharply worldwide, the returns on education have deteriorated only slightly, but remain positive. This can only mean that the world demand for skilled labour continues to increase, i.e. that the market is far from saturated with skilled workers.²⁵

Aspect No. 3: Life satisfaction – education means happiness

The fact that education affects the wellbeing of individuals and entire societies can be empirically supported. That education makes people happy is more difficult to establish, at least for children and adolescents. Most young people experience school as a mandatory chore and not as personal enrichment, benefit or even source of happiness. One of the two authors of this book was so unhappy in his Austrian primary school that as a 15-year-old he wrote an angry article for the school newspaper with the title: “Elementary School, a Crime Against the Child”, in which he attacked compulsory education.²⁶ The other author was so uninterested in school for many years that his transfer to the next class was sometimes extremely uncertain. In retrospect, the resistance to education was the result more of discouraging teachers, boring curricula and a lack of practical, real-life learning content. School could hardly contribute to the happiness of these two young people.

The idea that education makes us unhappy is even common among some scientists. The Austrian philosopher Konrad Paul Liessmann entitled the preface to a book on education “Why education does not make us happy.”²⁷ Therein he describes three types of education which all result, in his view, in disaster. The first is classical humanistic education which, in the face of the injustices and atrocities of this world, must necessarily lead to despair. The second, modern utilitarian education, requires that every full-fledged member of society must constantly keep their skills up to date in order to remain competitive, but this ultimately leads to the realisation that one is but a heteronomous cog in the service of economic profit. And the third is education that forms critical, responsible and mature citizens, who must ultimately also despair in the constant knowledge of their own ignorance.

These expectations may be typical of a pessimistic philosopher, but they are not founded in reality. Empirical data from nearly every country in the world shows that education, despite these gloomy expectations, is a real lucky charm. There are numerous international surveys that try to ascertain the life satisfaction of people.

25 Montenegro, C.E. and Patrinos, H.A. (2014): Comparable Estimates of Returns to Schooling around the World. The World Bank Group. Policy Research Working Paper WPS7020. World Bank, <http://documents.worldbank.org/curated/en/830831468147839247/pdf/WPS7020.pdf>

26 Lutz, W. (1972): Elementary school, a crime against the child. *Informationen (Student newspaper of the Schottengymnasium of the Benedictines in Vienna)*, 1: 2-4.

27 Liessmann, K.P. (2014): *Geisterstunde: Die Praxis der Unbildung*. Vienna: Piper.

Most often people are asked to classify their overall life satisfaction on a scale from “very unhappy” to “very happy”. These studies, which are repeated at monthly and yearly intervals, show that people generally give very consistent information and cannot be influenced by short-term events and feelings. If the level of education and income are also included in the investigation, interesting conclusions can be drawn.

A very clear pattern emerges virtually all over the world: the more educated segments of the population describe themselves as “very happy” or “happy” to a much higher degree than the less educated. In the age group of 35- to 45-year-olds 90 percent of people with higher education classify themselves in one of the two categories of happiness. People with medium education do so at 85 percent and those with lower education only at 78 percent. Conversely, the percentage of subjectively unhappy people is significantly higher among the less educated than among the better educated.²⁸

Interestingly, money does not make one happier after a certain income level. As long as people have to struggle financially to meet their basic needs, they are clearly happier when they succeed. However, the increase in happiness becomes smaller with each additionally earned euro or dollar. Soon the growth curve of happiness begins to flatten with additional income. At some point more money does not yield additional happiness at all. This applies both to individuals within a country as well as to the comparison between poor and rich countries.

This effect is called the Easterlin Paradox, named after the American economist Richard Easterlin.²⁹ The scientist was the first to study this relationship internationally in the 1970s and has been able to confirm it many times since. Results always showed that after a certain amount, more money did not make people happier. With regards to education, this sort of oversaturation does not seem to occur: if a high level of education rises even further, personal happiness will on average also increase.

The link between education and happiness can be explained relatively easily. International happiness surveys show which factors contribute to the happiness or the misery of people: employed people are significantly happier than unemployed. The latter are often plagued by anxiety and depression. People who say that they feel physically and mentally well are on average happier than others. Friends and social networks also contribute to happiness. Democracy makes people happy because

28 Striessnig, E. (2015): What do we know about education and happiness? PhD thesis, Vienna: Vienna University of Economics and Business.

29 Easterlin, R.A. (1974): Does Economic Growth Improve the Human Lot? In: *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*, David, P.A. and Reder, M.W. (ed.). New York: Academic Press, pp. 89-125.

they feel they have a say and exercise control over their environment. Having a job, remaining healthy up until old age, or looking forward to an active circle of friends – all this depends largely on the level of education. Hence, education is the key to happiness.

Again, people in desperate situations, in crisis countries or war zones, people who have inadequate access to education and little chance of determining their own lives or to provide a future for their children, are often objectively and subjectively unhappy. These people often have little to lose and little hope. They resign or take risks that would be incomprehensible elsewhere. They tend to fall prey to the promise of ideologues, they are easier to radicalise. For desperate individuals, death as a direct route to paradise may be more attractive than continuing to live in a hopeless everyday situation. Others leave to seek work in another country for a better life. For many others, the dire situation in life entails constant suffering in silence. These are the most pitiful losers in the battle of education cultures.

Aspect No. 4: Population growth – the role of women's education

Currently about 7.3 billion people live on earth, with the trend going upwards. How fast and how long the world's population will continue to grow is an open question. While in over 80 countries the number of children has, on the one hand, already fallen below the level at which a population without immigration can still grow at all, in some countries, such as Japan or Eastern Europe, the population has already started to shrink. On the other hand, countries in the less developed parts of the world, such as Asia, the Middle East and particularly Africa, will continue to grow.

Many countries in Africa have to expect a doubling or tripling of their population figures by mid-century. This is because of a continually high fertility rate. In Niger women have on average 7.6 children, in Somalia 6.6, in Nigeria 5.5. Population growth in central Africa amounts to 3 percent a year. Without restrictions, the population would double every 23 years. Under these conditions the six countries Angola, Cameroon, Chad, Central African Republic, Congo and Democratic Republic of Congo would have approximately 1.7 billion inhabitants in 2100. Today their joint populations number 150 million.

Since in these countries more and more young people continue to grow to adulthood, the population structure is extremely young, which means that an increasing number of women will enter child-bearing age in the future. The population would continue to grow even if women only had two children on average. This rapid growth makes any development efforts difficult in the affected countries.

Even if governments built schools and trained teachers, in some places more children grow up than can be educated. The number of people is increasing faster than the

number of nurses or doctors. New jobs are not created at nearly the pace at which the population is growing, so that thousands of young adults can hardly expect a secure existence. In many sub-Saharan countries, where half the population is still below 20 and still looks forward to the longest phase of their potential parenting, these problems threaten to become unmanageable.

In Mali, Uganda and Senegal the proportion of poor people has indeed halved within the framework of the Millennium Development Agenda 1990-2015, which at first glance looks like a great success. But because so many new poor people are being born, the absolute number of those who live on a bare minimum has hardly changed. In Niger, the country with the highest relative increase in population in the world, approximately 700,000 more people were classified as extremely poor in 2015 than in 1990.³⁰ It is no coincidence that these countries in which the number of frustrated young people is growing rapidly are particularly vulnerable to armed conflict, to radicalisation and the spread of religious fanaticism.

The United Nations expects in the medium variant of its population projections that humanity will have increased to over 9.5 billion by mid-century and to almost 11 billion people by 2100 – and will still not stop growing.³¹ This growth is almost entirely due to population increases in the least developed countries. But global growth could also be much slower and even grind to a halt within a few years – when education in countries with high growth rates spreads, most significantly among women.

In virtually all countries of the world highly educated women have fewer children than uneducated women. This difference is especially strong in regions that are still in the early stages of demographic transition – i.e. transitioning from high to low birth and death rates. In Kenya, for example, women with no education had on average 6 children in 2010. Women who had at least completed secondary school only had 2.5 to 3 children on average. In Ethiopia the number of children for women with high school degrees has already fallen to 1.2, while women without education still have more than 5 children. Similar patterns apply to most developing countries and there are many reasons to believe that in countries with a high birth rate the education of women acts is causally related to the decline in the birth rate.³²

30 Herrmann, M. (2015): *Consequential Omissions. How demography shapes development. Lessons from the MDGs for the SDGs*. Berlin: Berlin Institute for Population and Development.

31 UN Population Division. (2012): *World Population Prospects: The 2012 Revision*. New York: United Nations.

32 For a detailed discussion of this topic see: Lutz, W. and Skirbekk V. (2014): How education drives demography and knowledge INFORMS Projections. In: *World population and human capital in the 21st century*, Lutz, W. et al. (Ed.). Oxford: Oxford University Press.

One important reason for this is quite simple: if girls not only go to school for a few years, but have the chance of obtaining a secondary education, they escape the marriage market, where they would otherwise already be placed at the age of 14 or 15 years in many poor countries. In Chad and Niger about a third of all 15-year-old girls live in marriage or cohabitation.³³ In early marriage or early cohabitation, the first pregnancy follows quickly. Even as teenagers many of these girls are already mothers of a number of children. Complications during pregnancy and childbirth are the most common cause of death for 15- to 19-year-olds worldwide.

A longer time spent in education leads to later pregnancies all over the world.³⁴ If school blocks the (often illegal) practice of marriage of minors, at least for a few years, these women will have their children later than women with no or only primary education. If they have several children, the intervals between the births are greater. Both effects are significantly less exhausting for mothers and directly affect the health of newborns. Education helps both mother and child.

Data provided by large-scale health surveys also show that better educated women want far fewer children because they think rationally about their family size, want to protect their own health, are often employed outside the home and can assert themselves against their partner and their family. Especially in traditional, patriarchal societies, the word of the parents and the man carries more weight than that of women. Men frequently want to have more children than women do. In general, fertility rates fall when women get more rights.

Women with better education will also want to provide their children with a good education (again, the education level of the father has little impact here); this is usually associated with costs and hence again leads to fewer children. Finally, women with higher education will find easier access to safe methods of contraception.

Fewer children mean development opportunities

Falling offspring figures would entail a demographic bonus in the affected states. This would be because the baby boomers of the past and fewer children in the present mean that an exceptionally high number of people are currently of working age. If it is possible at this stage to educate the large number of young people who can work and provide them with jobs, economic development will gain momentum. Then societies will enjoy a demographic dividend. This model, which the Asian tigers demonstrated in an exemplary way, can only become a reality in Africa, West

33 UNICEF (2011): *The state of world's children 2011. Adolescence: An Age of Opportunity*. New York: UNICEF.

34 Kirdar, M. et al. (2009): The Impact of Schooling on the timing of Marriage and Fertility: Evidence from a chance of Compulsory Schooling Law. http://www.erf.org.eg/CMS/uploads/pdf/1224079467_15thAC_LBR_Dayioglu_Kirdar_Koc.pdf (accessed on 12-10-2015)

Asia and the Middle East when education leads to a reduction in both population growth and at the same time increases human capital for economic growth. Both seem unattainable where fundamentalist opponents to education are at work, or where those in power are hardly interested in providing education to the population at large.

Thus, education is an important basis for the ascent of especially less developed countries, which face rapid population growth under high pressure for development. Practically in all countries that have already experienced this development, it has been shown that education is the best way to achieve personal and social prosperity.

Aspect No. 5: Climate change – education reduces vulnerability

Interestingly, education even has an impact on an area where at first glance the question of life or death is decided by chance: natural disasters such as heat waves, tsunamis or hurricanes. These can be hard to predict and affect those who are in the wrong place at the wrong time, as one would think. But this is only part of the story.

On 26 December 2004, an undersea quake with a magnitude of 9.3 occurred in the Indian Ocean.³⁵ The epicentre was located some 85 kilometres off the north west coast of the Indonesian island of Sumatra. It was one of the strongest earthquakes ever recorded, triggering a devastating tsunami along many coasts of the Indian Ocean. In total, approximately 230,000 people died, 165,000 of them in Indonesia. An estimated 110,000 people were injured and more than 1.7 million coastal residents lost their homes.

Ten months before the devastating catastrophe the Statistical Office of Indonesia had carried out a large, representative survey on the development of households in the affected region. Hence, reliable data on family size, health, income and education level were available by chance. Approximately one year after the disaster the office repeated the survey in all households in the disaster area, which could still be identified, and again four years later.³⁶ This enabled a comparison of the situation of thousands of households that were directly or indirectly affected by the disaster before and after the tsunami.

The result was startling. Among male victims the proportion of the less educated was high. The benefit of education was even more evident for survivors. Regardless of their previous earnings, better educated men and women found it easier to get back to their normal lives and find re-employment. Five years after the disaster highly

35 Tsunami alarm system: occurrences of tsunamis in the Indian Ocean. <http://www.tsunami-alarm-system.com/phaenomen-tsunami/vorkommen-indischer-ozean.html>

36 Frankenberg, E. et al. (2014): Education, Vulnerability, Resilience and after a Natural Disaster. *Ecology and Society*, 18 (2): 16.

educated people were in a better psycho-social condition than the less educated. Education was obviously an important factor for resilience, the ability to recover from a disaster.

Another example of resilience in natural disasters is offered by Cuba, the Dominican Republic and Haiti. They are all located in the transit area of severe hurricanes, which lash the Gulf of Mexico on a regular basis in late summer and early fall as they move from the warm Atlantic westward towards land. These hurricanes are likely to increase in number and intensity in the context of climate change. Because they often threaten densely populated coastal areas on these islands, the damage to infrastructure is usually high and there are many victims to mourn.

But the vulnerability to natural disasters is very different in the individual Caribbean countries: in Cuba there are only few deaths, in the Dominican Republic usually several dozen, while in Haiti hundreds if not thousands die from the effects of storms. The explanation for the difference can again be found in education. In Cuba the population is poor but very well educated because of its planned economy. The Dominican Republic is much richer, but the government invests less in education. Finally, Haiti is destitute and, in terms of education, a completely backward developing country.

Why is the death toll of hurricanes of comparable extent so different in directly neighbouring countries? Studies on this subject show that education and related factors such as efficiency of social organisation, which is particularly pronounced in Cuba, play an important role. This applies before, during and after the disaster.³⁷ Early warning systems work more efficiently in more educated societies. People who are better at detecting potential dangers thanks to their education usually respond with more foresight and caution.³⁸ If a hurricane actually approaches the coast, these individuals tend to be able to protect themselves better and recover faster from incurred losses. Again, education is usually more important than income.

What is true of the tsunami in Indonesia and the hurricanes in the Caribbean is reflected worldwide in the relationship between education and resilience to natural disasters. A large study which examined the number of victims of all registered natural disasters during the period 1970-2010 comes to the clear conclusion that the education level of the population is the most important protective factor. It

37 Pichler, A. and Striessnig, E. (2013): Differential Vulnerability to Hurricanes in Cuba, Haiti, and the Dominican Republic: The Contribution of Education. *Ecology and Society*, 18 (2): 31.

38 Muttarak, R. and Pothisiri, W. (2013): The Role of Education on Disaster Preparedness: Case Study of 2012 Indian Ocean Earthquakes on Thailand's Andaman Coast. *Ecology and Society*, 18 (2): 51.

affects the ability to minimise the damage caused by unavoidable natural events more significantly than economic output or cultural factors.³⁹

Because it can be assumed that tropical storms, floods, extreme heat waves and droughts will not only occur more frequently in the future as a result of climate change, but also become stronger in impact, this scientific insight has enormous political significance. Investment in education would then be a particularly effective instrument for adapting to the unavoidable consequences of climate change. The international community has already resolved to launch a global climate fund of US\$ 100 billion a year to help poor countries cope with the changes. What exactly should happen with the money has not yet been decided. A large part will probably be invested in dams and other technical infrastructure. At least part of the money, however, should be used for the propagation of education in developing countries. This would give people the opportunity to better protect themselves against future climate disasters.

Aspect No. 6: Education promotes democratisation

If better educated people are healthier on average, if they can live longer and more fulfilled lives, while also improving their income, i.e. afford more, then it could be expected that they would become more active members of society and more involved in matters of public interest. In fact, the history of the past 50 years shows a clear link between rising education levels and democratisation worldwide.

This is because democracies at least try to offer equal educational opportunities to all people regardless of their social origin. In fact, democracies often achieve social advancement through education. On the other hand, a broadly educated society also makes the emergence of democracies more likely. People are primarily empowered through education to stand up for their own rights and enforce them. Moreover, educated people are more open to pluralistic societies, more tolerant of minorities and other religious beliefs; they are politically more active and far more involved in advancing the common public good.

They have a greater understanding of democratic achievements such as free elections, civil rights and equality between women and men. The benefits of democracies make more sense to them. This, in turn, is a consequence of their easier access to politically relevant information, which they can analyse critically; they prefer an exchange of arguments to a violent confrontation. Democratic societies have a vested interest in expanding the education of their citizens and thereby consolidating their system of

39 Lutz, W. et al. (2014): Universal education is key to enhanced climate adaptation: Fund more educators rather than just engineers. *Science*, 346 (6213): 1061-1062.

government. Broad social human capital makes it possible to peacefully organise a community and jointly develop it further.⁴⁰

In the last 50 years there has hardly been a country with a low level of education that was able to develop and sustain a democracy. Conversely, virtually every country with a well-educated population has remained a stable democracy. The relatively smooth transition of autocratic countries in the sphere of influence of the former Soviet Union into independent nations can be explained by the relatively high level of education. Under communism education was the framework for the empowerment of the masses. Of these former communist countries, the Baltic states, Poland and the Czech Republic have made the most rapid transition into functioning market economies and veritable democracies. In 1989 these countries reported their highest levels of education.

This relationship also explains why undemocratic regimes often consider the education of wide sections of society a threat. Dictatorships tend to stabilise their power within a small clique and keep people without any skills at a distance. Whether this strategy will stand a chance against the global expansion of education remains to be seen. Even in most undemocratic countries, education levels rise continuously – also as a result of global education campaigns by UNESCO and UNICEF. This is not true for all countries: states such as Somalia, Afghanistan, Yemen or Sudan – countries in which fundamentalism and religious fanaticism spread and educational initiatives are eroded rather than flourish – need to prepare for a long, tortuous journey towards a possible democratisation. These countries represent the greatest uncertainties on the road to the peaceful development of mankind.

In 2010, a study statistically analysed the influence of education levels on democratisation based on data from 120 countries. The researchers also looked at how well different age groups and both sexes were qualified. Again, results clearly showed that better education for the younger population, especially women, is the decisive factor for authoritarian regimes to transform into modern democracies. It is more important than, say, economic development or the degree of urbanisation. And as with the question of economic development, investment in education must be made at least two decades before possible democratisation.

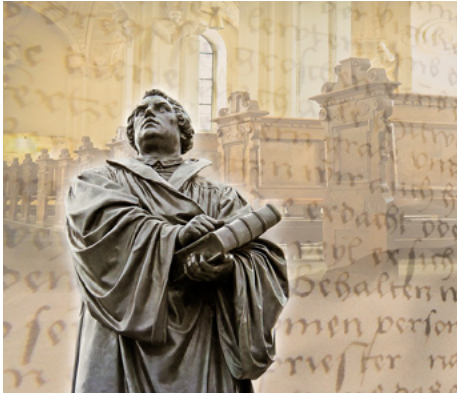
From the results the authors conclude that it is precisely Iran, often classified as fundamentalist, that displays the best conditions to develop into a democracy. The country has invested a lot in education over the past three decades, which has particularly benefited young women. Indeed, in rural areas of Iran the literacy rate

40 Glaeser, E.L. et al. (2007): Why does democracy need education? *Journal of Economic Growth*, 12: 77-99.

of 25- to 29-year-old women was ranked at only at 22 percent in 1986, but rose to 84 percent in 2006.⁴¹

The accumulated experience of other countries shows that such a massive increase in women's education makes a transition to democracy much more likely, even if it is not possible to predict from the data when and how this will happen. However, the general pattern is clear: on average education makes a decisive difference on the road of peaceful development towards democracy.

41 Lutz, W. et al. (2010): Demography, Education and Democracy: Global trends and the case of Iran. *Population and Development Review*, 36: 253-281.



7

PROGRESS OR DISASTER?

Scenarios for the future

Looking into the future is always difficult yet necessary. The future is by definition uncertain and you cannot know precisely what will happen next. This is particularly true for social, economic and political trends. If one simply extends the present on the basis of the principle “Everything remains just as it is now”, one can easily arrive at the wrong conclusions. For one thing, the factors influencing the course of events change over time. Secondly, unexpected events can shift traditional social balances – as happened with the outbreak of the AIDS epidemic or the end of the Cold War. And thirdly, individual components of development mutually influence each other and this can lead to complicated and hardly predictable feedback effects and abrupt changes.

A good example illustrating the third point is the effect of education. For the past few centuries it has enabled people in many regions of the world to escape the cycle of underdevelopment, to be healthier and to grow economically. Growing prosperity and coming out of poverty – something that everybody hopes for – have led to greater consumption, but as a consequence the higher consumption of

materials and energy has aggravated environmental problems, from water pollution to climate change. Education, in a way, has made things worse. But education also contributes to people's heightened understanding of environmental problems and makes them better able to see the connections and more willing to change their harmful behaviour. Education also slows population growth, which makes dealing with environmental problems easier. These problems, in turn, have become so great that only the scientific understanding and technical know-how of a qualified population can master them. With these complex and interacting effects, it is not easy to draw a clear picture of the future and produce reliable forecasts.

Nevertheless, every community, every business, every policy requires a certain vision for the future. Everyone needs a perspective and institutions need a strategic planning basis for how tomorrow and the day after tomorrow will be organised. A private household needs to know how many people need to be fed the next day. A state must plan its infrastructure, including the number of hospitals and schools that will be needed in the future, and ensure the security of pensions.

To meet this need for forecasts under conditions of uncertainty, science enables the creation of scenarios, i.e. "conditional" forecasts, where the range of possible outcomes depends on specific transparent assumptions. Such a range of different alternative future pathways that are all in principle possible, but not necessarily likely, can provide a useful picture of the (potential) future. Scenarios are not predictions, but collections of consistent assumptions that show a range of possible paths forward. They help to assess policy options and are therefore important planning tools. Scenarios often range from a most negative (worst case) to an extreme positive case (best case).

In the 1970s the Club of Rome famously devised the scenario technique in its report on the "Limits to Growth".¹ Based on a number of "what if" assumptions, scientists tried to analyse how specific factors interact with each other in feedback control loops – how, for example, the global food situation and the stocks of raw materials change when more and more people consume more and more resources and thus produce more garbage of all kinds. The result is known: the researchers predicted the collapse of humanity at just around this time.

Such a possible collapse cannot be entirely ruled out today, although many of the outcomes of the Club of Rome scenarios were shown to be false. They had, for instance, underestimated the reserves of raw materials or the speed of technical innovations and changes in human behaviour. Even if humanity suffered a collapse in the 21st century, it would happen for reasons other than those predicted in 1972.

1 Meadows, D. et al. (1972): *The Limits to Growth. Report of the Club of Rome on the Situation of Mankind*. New York: Universe Books.

Today it has become clear that the main environmental problem facing humanity is not the scarcity of raw materials, but the exact opposite, i.e. their unexpectedly vast availability. Because there is far more coal, oil and gas than originally assumed, the disposal of waste products of all the economic activities turned out to be the real problem. The carbon dioxide produced by burning fossil fuels is mainly responsible for climate change, which continues to gain momentum and is expected to change living conditions in many places of the planet.

While we know that we live in a world of interdependent systems, we still do not know enough about how exactly these systems work. The problem of systems analysis was and still is that a lot of simplifying assumptions have to be made and one cannot model the real world comprehensively. The scientists of the Club of Rome had underestimated or not considered many possible feedbacks, which we know today have been decisive in determining the actual outcomes. And the feedbacks can be different in different parts of the world and can also reinforce each other over time. So it is possible that in some regions a shortage of water resources leads to more fuel-efficient technologies and a search for alternatives – while it leads to collapse in others. Since the report of the Club of Rome, agricultural research has responded to the food shortage by breeding high-yielding crop varieties. These newly created varieties, part of the “Green Revolution”, were hardly useful in some places, while being highly successful in others – the latter mostly in those rural areas where the level of education was higher than in those where hardly any advantage could be derived from the new varieties.² The world was just too complex to describe with a (then extremely simple) model.

Nowadays, it has become clear that complex, self-regulating systems can be better simulated when they are divided regionally and the focus is placed on those sectors of action for which reliable data are available, so that they can be modelled more realistically. Especially in the field of global energy and climate systems, models have improved considerably in recent years. In this context science today mostly uses so-called “integrated assessment models” for long-term predictions. In these, complex consequences of different developments and policy decisions are simulated. Integrated Assessment is a gradual process, at the start of which a concrete policy question is posed, such as “What would be the consequences of a particular change in the mix of energy use on the future climate and thus on future water supplies in certain regions of the world?”

Because the possible future developments of society, the economy and politics are even harder to model than those of the climate, the scientific community has

2 Feather, G. and Umali, D. (1993): The adoption of agricultural innovations: A review. *Technological Forecasting and Social Change*, 43 (3/4): 215-239.

moved to developing alternative qualitative narratives that describe different, but in themselves consistent, pathways in which the world could evolve in terms of socio-economic development. In the context of these alternative possible worlds diverse policy options can be assessed, providing a basis for decisions to be made by policy makers and other stakeholders.

The future can be partially controlled

The best global models and currently most prominent scenarios for integrated impact assessment have been designed for the Intergovernmental Panel on Climate Change (IPCC).³ This is understandable, because climate change is one of the most serious challenges of our times and calls for the most comprehensive negotiations and consensus processes at the international level that humankind has ever had to deal with. The scenarios describe in what social and economic direction humanity will develop in different countries and world regions over the 21st century on the basis of a certain set of assumptions. They describe different levels of capacity to mitigate climate change or adapt to already unavoidable consequences. In combination with other scenarios on future greenhouse gas concentrations in the atmosphere, they are the basis for assessing the possible impacts of climate change on future human wellbeing in different parts of the world.

These scenarios and the underlying models illustrate which factors will influence the future most negatively or positively. Energy-saving technologies, renewable energy sources, lower meat consumption, but also reduced population growth are parameters for a positive development. Economic development in the emerging and developing countries according to the old pattern of the industrialised nations, on the other hand, would be the decisive factor that makes mitigation in the future much more difficult hence exacerbating the impact of climate change. Among all the adjustment screws that lead to positive or negative outcomes, education plays a central role. The skills of the people, the accumulated human capital, are the core of these scenarios indicating both mitigating and adaptive capacities.

These different portraits of tomorrow's world are called "shared socioeconomic pathways", in short SSPs. A number of important international research groups from climate science, energy research, long-term economics, population and agricultural research have agreed on these common socioeconomic scenarios in order to compare their analyses and results. They describe how humanity will develop if we behave in this or that way. As expected, we have to prepare for a bright or a less bright future. The three major pathways into the world of tomorrow are briefly outlined here.

3 Moss R. et al. (2010). The next generation of scenarios for climate change research and assessment. *Nature* 463: 747-756.

SSP1 – Best case: the path to a rapid and sustainable social and economic development

This scenario describes the best of all possible realistic paths into the world of tomorrow. It assumes that societies are willing and able to reduce their consumption of raw materials and free themselves from their dependence on fossil fuels. Today's poor countries develop because of improved international cooperation and catch up with rich countries. In the less developed parts of the world investment in education significantly increases to ensure that more people – especially the large numbers of young people – can take on productive jobs, start businesses and create new jobs themselves. The health of these people is improving and life expectancy rising. Fertility rates decline in developing countries and population growth slows down.

In this scenario better education and greater solidarity contribute to the fact that people get involved more for the common good, demand more political participation rights and effectively control governments through elections. Through such control and because more capable people rise to government offices, politicians assume more responsibility to set concrete development goals and enable people to improve living conditions, such as gaining access to clean drinking water or to good medical care. Environmental awareness grows and is innovative, and resource-saving technologies are quickly adopted by industry and agriculture. Thus, today's developing countries skip the polluting phases of industrialisation, which once led to major problems in the Old World. Environmentally friendly economic growth has a pacifying effect on societies. Harmonious coexistence is facilitated by the citizens' high level of education, solidarity and a spirit of community, and by efficient social security systems.

In this scenario the clash of education cultures is resolved through prosperity, scientific progress and democratic societies, in short, through the prevalence of global education. This best-case scenario is only possible if the less developed countries immediately, massively and systematically invest in quality education for all – following the successful models of education in the Western world, but also in societies such as Singapore or South Korea, which had a late and difficult start. For rich countries too, SSP1 means more investment in education, especially in order to share economic success with disadvantaged population groups, to counteract the aging of societies and to enable cutting-edge research and technological innovation, which are necessary for overcoming the major global challenges of the 21st century.

SSP2 – Business as usual, or: more of the same

This is the middle-of-the-road scenario into the world of tomorrow in all respects. It assumes that the development of the past decades can continue. Industrialised

countries continuously but slowly reduce their consumption of resources and raw materials. Technological progress continues at the same speed as today. Development in the poor countries continues as before with no strong consistent trend. Some of these regions follow the example of the successful emerging economies, others fall further behind and experience political unrest, which also has effects beyond the respective countries' borders. However, most countries remain politically stable and global markets enable a lively exchange of goods.

This leads to moderate growth of the global economy and per capita incomes; the poorer countries grow faster than the rich ones and catch up slowly but steadily. Global institutions to tackle international challenges are still rare and the scope of their influence remains limited. Education slowly spreads in all regions of the world. In the poorest countries this progress does not suffice to reduce population growth significantly. As a consequence health systems and labour markets remain under stress in those countries.

SSP2 not only occupies the middle ground, but it can be considered, from today's perspective, as the most likely scenario. Under these conditions, the greater part of the world experiences further improvements in living conditions, a growing number of countries embark on a positive development path and the clash of education cultures slowly moves into the background. The situation remains critical in those regions of the world in which people have to live without adequate medical care and without sufficient jobs, where access to safe drinking water is rare and people's discontent leads to conflicts and radical solutions. Because global environmental protection increases only slowly in this scenario, the least developed countries will also be most vulnerable to climate change and other global crises.

SSP3 – Worst case: development stagnates and the world splits into rich and poor

In this pessimistic development model there will be a divided world – on the one hand, there are numerous regions with extreme poverty, high population growth, collapsing health systems and political chaos, and on the other hand, rich areas which increasingly isolate themselves from this misery and scale back their cooperation with poorer countries. Nationalistic egoisms displace the idea of global cooperation. Isolation and lack of international cooperation lead to de-globalisation and a decline in international trade.

Even the rich countries cannot find a compromise in the fight against climate change, because they are guided only by national interests. Since even these countries suffer from the decline of the global economy, investments in education, research and technological improvements decrease, which further exacerbates the problem. The

expansion of education, the engine of social development, comes to a halt. In rich countries the gap between the wealthy and better skilled and a growing underclass of poorly educated people, who lose touch with the affluent society, is growing.

In this fragmented world neither the development objectives of poor countries can be achieved nor is it possible to reduce the dependence on fossil fuels. Other environmental problems such as air and water pollution cannot be solved. For the majority of people this scenario means a brutal struggle for survival. In the countries with the strongest population growth, per capita incomes decrease and poverty continues to spread. In the cities of the developing countries slums grow, where violence, pollution and hopelessness reign. Climate change, caused by the rich countries, is progressing unabatedly and this in turn means water shortages, flooding near coastal areas, other environmental disasters and conflicts over distribution for the poorest countries.

The number of frustrated individuals is growing rapidly and particularly in the countries of Africa, the Middle East and parts of Asia the tensions are intensified in the tougher battle between education cultures, terror, religious fanaticism and a further decline of education. In these countries a downward spiral of misery, poverty and long-term population growth takes momentum. Massive flows of refugees burden the neighbouring countries of the crisis regions, but can also reach the last remaining islands of prosperity and stability.

Who can solve the great challenges of the 21st century?

It is obvious that the major challenges of the 21st century can only be successfully met, if at all, in the first scenario. But what are these global challenges and what globally effective measures would be needed to address them? The list is long and, depending on which institution is asked, the answers differ. The World Economic Forum lists ten areas of concern, including global corruption and the future of the global financial system.⁴ The Millennium Project lists fifteen points, from organised crime to women's rights.⁵ The G-7 Summit in the Bavarian Elmau in June 2015 also added marine protection and resistance to antibiotics on the agenda.⁶

But in all the lists of the biggest challenges facing humanity we find the following issues that urgently need to be addressed: How can we feed and supply the growing

4 World Economic Forum (2015): 10 global challenges. 10 expert views from Davos. <https://agenda.weforum.org/2015/01/10-global-challenges-10-expert-views-from-davos/>

5 The Millennium Project (2014): Global Challenges for Humanity. <http://www.millennium-project.org/millennium/challenges.html>

6 G7 summit (2015). Key topics for the summit announced https://www.g7germany.de/Webs/G7/EN/G7-Gipfel_en/Agenda_en/agenda_node.html

number of people with enough work or income? How can health be improved, and premature deaths avoided? How can drinking water reserves be used sustainably and how can devastating climate change be prevented? How can social injustice, poverty and violence be overcome?

All these questions are interrelated and closely linked. They are all connected to an ever-growing human population, whose demands also grow. They require an intelligent, creative, i.e. holistic, approach and can only be solved by peaceful means through the joint effort of as many nations as possible.

The good news is that the problems are solvable. The bad news: the solution requires the rapid socio-economic development of poor countries, global use of the best, most environmentally friendly technologies and, in rich countries, the willingness to change consumer behaviour and to refrain from using things that we take for granted today – overall, an exhausting effort without equal. Education of the whole population, especially women, who are often still disadvantaged, and enlightened societies that reflect on, question and change their own actions are the prerequisites for success. The education of large parts of society cannot save the world on its own, but it is an important prerequisite. In addition, other conditions must change, more jobs must be created, political stability and binding legal systems are needed. In other words, education is a necessary but not a sufficient condition for these developments. Education is not everything – but without education, there is nothing.

Education primarily influences one central problem of humankind today: continued strong population growth, which is a big problem in areas where it is particularly high. The effect of education on fertility rates, as we have seen, is scientifically well researched and therefore our understanding of these relationships can be used for predictions. We know that education in countries with a high number of children effectively functions as a contraceptive. The higher the educational level of women, the fewer children they want, the better they can gain access to contraception and the smaller the number of their offspring.

Because we know for practically all countries of the world how many children women with different levels of education will have, it can be readily calculated what demographic effects further investments in the education system will have. For each country, for each region of the world and for all humankind scenarios of population growth can hence be modelled, depending on future education initiatives. Since education has an impact on health, we can in addition predict the effects of more education on infant mortality and total life expectancy.

The influence of education on the size of the global population: three scenarios

In the first scenario SSP1 (the best case), i.e. the path to rapid and sustainable social and economic development, with investment in education modelled after the most successful Asian tigers, about one third of the world's adult population will have acquired an education up to the age of 21 years by the middle of the 21st century. By 2100, about half of humanity would be that well educated. The number of people without any formal education would decline from the current level of about a billion to one third of that. It cannot approach zero because, to this day, many children in Africa and parts of Asia still do not go to school. This situation cannot be resolved overnight, and when one does not learn to read and write at an early age, one will usually remain illiterate for the rest of one's life.

Under the terms of SSP1, global population growth would soon subside and level off by mid-century already, followed by a slow decline in world population. Total world population would increase from the current 7.3 billion to around 8.5 billion in 2050 and then decline to about today's level in about 2100.

In the second, "business as usual" scenario SSP2, in which the global educational landscape continues to evolve without any substantial change, the global population would grow to over 9 billion in 2050, reach its peak around the year 2075 at about 9.4 billion, and then, by the end of the century, slightly fall to 9 billion. At the same time the average educational level of the world's population would continue to improve. The main reason is that over time older generations who never attended school will die and younger, already better educated cohorts take their place. The demographic billionaires in India and China are particularly relevant here, because today already young people receive a much better education than their parents. In fact, in almost every country of the world young people today are better educated than their elders and this trend will continue with a further expansion of education.

The stagnation scenario SSP3 (worst case), finally, means that the number of young people without schooling, contrary to the trend of recent years, will continue to grow. The reason is that the population would grow dramatically in poor countries and outpace the growth of the education infrastructure. By the middle of the 21st century humanity would reach the 10 billion mark. By 2100, there would be nearly 13 billion people, without an end of further growth in sight. Africa alone would grow from 1.2 billion today to nearly 4 billion.⁷ Most of these people would have little chance of leading a long and healthy life, finding reasonable work and making a decent income – i.e. living a life of dignity.

7 Lutz, W. et al. (ed.) (2014): *World Population and Human Capital in the 21st Century*. Oxford: Oxford University Press.

Depending on the scenario, the size of the world population would therefore develop very differently. By mid-century the best -case scenario would be distinguished from the worst case by 1.5 billion, which would increase to 5.7 billion people in 2100. Interestingly, the latest forecast by the United Nations, published in the summer of 2015, projects that the world population will increase to 9.7 billion in 2050 and reach 11.2 million in 2100. The UN population experts thus seem to consider the SSP3 scenario as the most likely one, a very challenging prospect. This outlook implies that it will not be possible to offer adequate educational opportunities to the increasing numbers of young people.

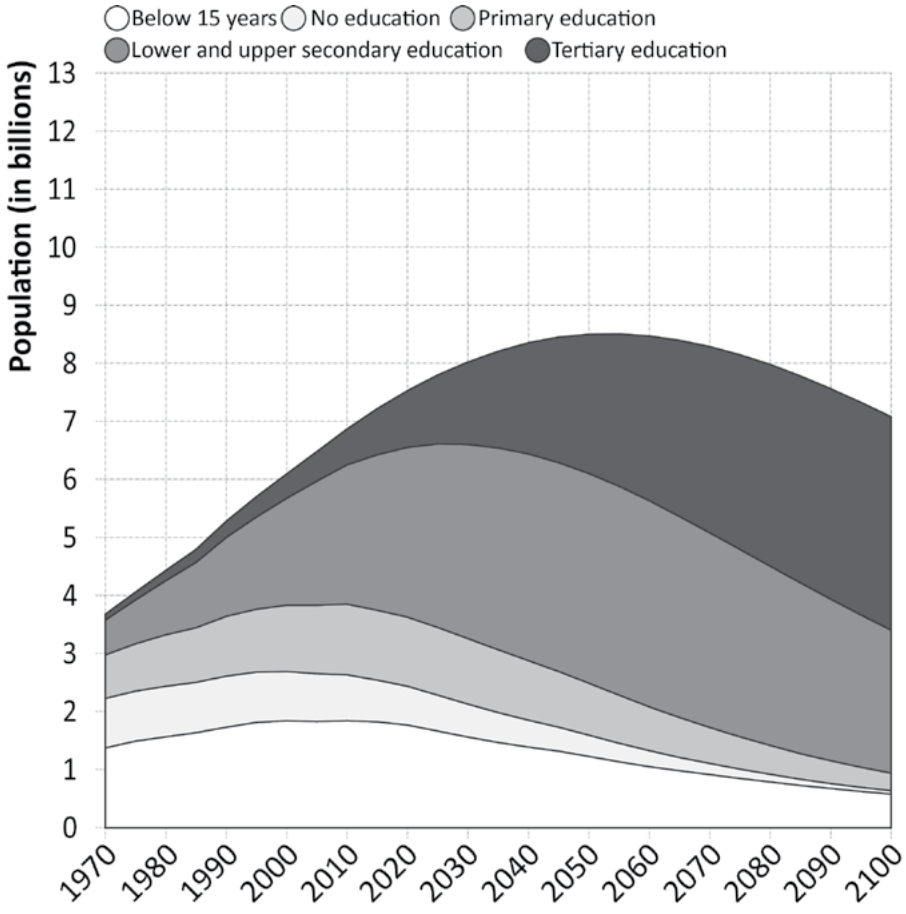


Figure 1

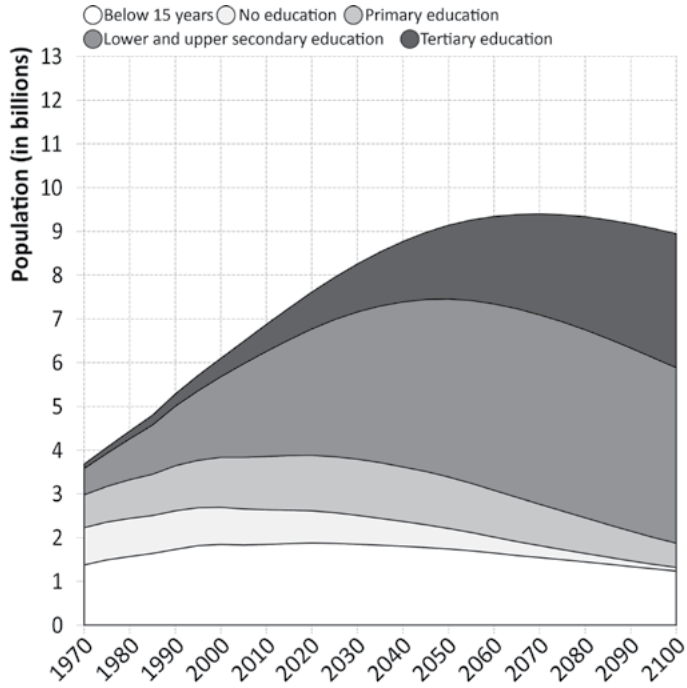


Figure 2

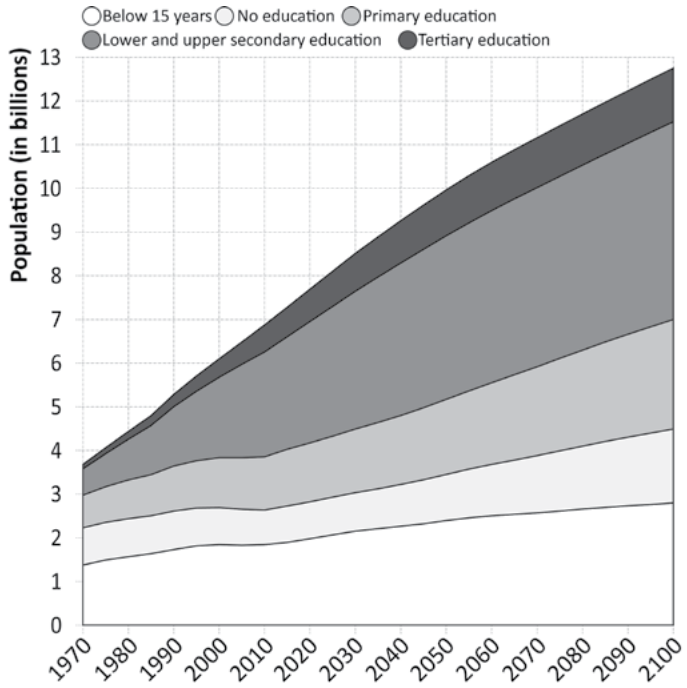


Figure 3

Beyond the issue of population growth, the three scenarios also describe very different developments in future worlds. Because education, for example, affects people's health, mortality rates for children and adults are far higher in SSP3 than in SSP1. In terms of average life expectancy, the difference between the two scenarios is about 25 years at the end of the century. Additionally, SSP1 means economic growth in all regions of the world and ideally, political stability and international cooperation follow. SSP3 shows pretty much the opposite. The consequences of climate change will be felt very differently in the two scenarios. In the scenario with the best education, four times fewer people die from climate-related natural disasters such as hurricanes, droughts and floods than under SSP3 conditions.⁸ It is clear that education is, quite literally, a prerequisite for survival in the 21st century.

Three big countries at the crossroads: Ethiopia, Nigeria and Pakistan

Given these figures, it is clear that education is a key factor to influence future developments. However, global aggregate figures in the scale of billions inevitably remain abstract and hardly help individual countries to draw conclusions for their own policies. Therefore, the Vienna-based Wittgenstein Centre for Demography and Global Human Capital performed the same calculations for all countries in the world.⁹ This means that national leaders, as well as experts in international development cooperation, can learn what effects could be achieved by appropriate education policies in each individual country.

Below we show the best- and worst-case scenarios for three selected countries: Ethiopia, Nigeria and Pakistan, the two most populous African countries and an Asian country that is considered to be particularly critical because of its population growth and its geographical and political situation. All three countries will decisively shape the future and the stability of entire regions in the decades to come.

Ethiopia – from starvation to hope

In 1970, Ethiopia was a feudal country with 29 million inhabitants in which a small elite dominated an army of poor farmers. The former king Haile Selassie was Emperor of Ethiopia from 1930 to 1974. In 1970 nearly half of all Ethiopians were under 16 years old, which reflected the high fertility rate of about 7 children per

8 Lutz, W. et al. (2014): Universal education is key to enhanced climate adaptation. *Science*, 346 (6213): 1061-1062.

9 The Wittgenstein Centre for Demography and Global Human Capital is based on a collaboration between the International Institute for Applied Systems Analysis (IIASA), the Austrian Academy of Sciences (ÖAW), and the Vienna University of Economics and Business (WU). The calculations have been published and are discussed in: Lutz, W. et al. (ed.) (2014): *World Population and Human Capital in the 21st Century*. Oxford: Oxford University Press.

woman, but also the fact that an average life lasted just 43 years. Hardly any adult woman had ever been to school. Only among the then recent cohort, the 15- to 19-year-olds, about 5 percent had been to primary school at least temporarily. The men had been benefiting a while longer from the first public schools in the country. Among the 30- to 34-year-olds 7 percent and among the 15- to 19-year-olds already 28 percent had at least incomplete primary education.

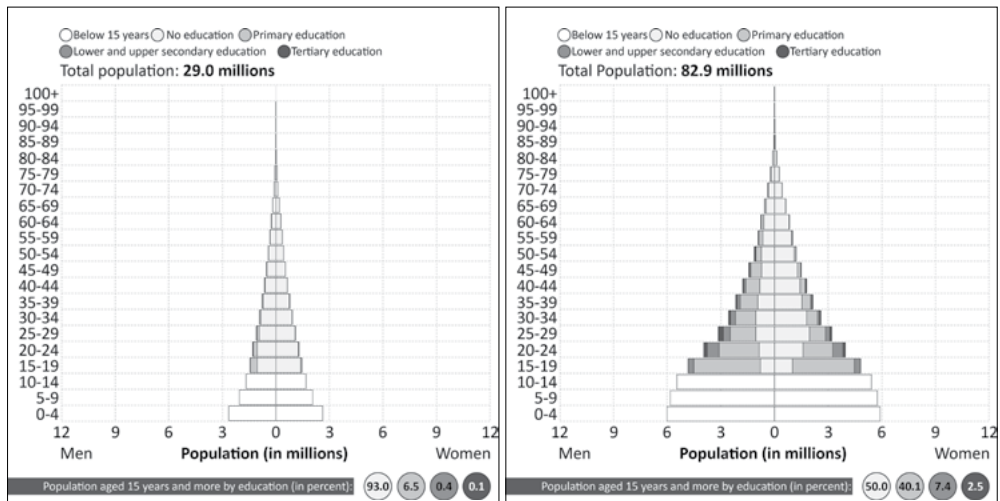


Figure 4 Age and education pyramid for Ethiopia in 1970 (left) and 2010 (right)

Given the extremely low level of education, the inefficiency of the government and the political situation, it is not surprising that Ethiopia remained a starkly poor country for a long time and became a symbol of Africa's failure. Even the starting conditions after the fall of Emperor Haile Selassie in 1974 were difficult; because Ethiopia consisted largely of desert and barren mountainous country, it had virtually no raw materials and had been regularly hit by devastating droughts. Under the socialist dictatorship and consecutive regimes, Ethiopia underwent many years of ethnic conflicts, plagued by border disputes with neighbours and a nearly 30-year-long war of independence with the province of Eritrea. After its independence in 1993, Ethiopia lost even its major trading access to the Red Sea.

By 2010, that is within 40 years, the population had risen to 83 million and had therewith almost tripled. The annual per capita income, however, had only just reached the equivalent of US\$ 350. The average Ethiopian therefore had less than one dollar a day and the country was still one of the poorest in the world. What cannot be inferred from these data were the first improvements in the educational landscape. Although the number of young people had increased dramatically, the majority of them, both men and women, already at least attended primary school, a certain percentage had a secondary school education and a few percent even went to university.

Considering the conditions of such a poorly developed African country, it is especially impressive how quickly women caught up. A clear effect of educational success is reflected in the number of children per woman, which had by then dropped to an average of 4.1. However, there is still an enormous difference between education levels. While women with no education still have an average of 5 children, women with higher education have only 1.1 children (see Figure 6). Equally impressive was the economic development: Ethiopia, the country that formerly connoted desperate hunger, now exports more food than it imports, and especially the region around the capital Addis Ababa has become increasingly industrialised – mainly with Chinese aid. Under these conditions more and more people can translate their higher level of education into higher incomes.

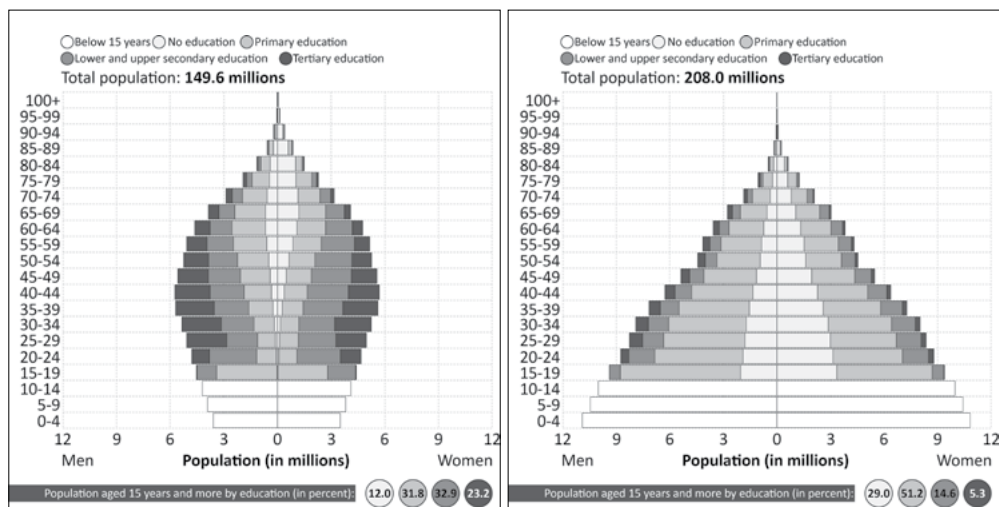


Figure 5 Age and education pyramid for Ethiopia in 2060, SSP1 (left), SSP3 (right)

But what does this trend mean for the further development of Ethiopia? Again, two scenarios emerge. Because the younger generations are already much better educated than the older ones, the adults of tomorrow will have much higher qualifications than those at present do, while the illiterate members of society of the past slowly vanish from the population pyramid. Society renews itself with every child that goes to school. If the education boom of recent years continues, the outlook for the future will improve significantly. However, because of the still relatively high fertility rates, there is no guarantee that this trend will continue.

This is exactly what two scenarios for Ethiopia show (Fig. 5). In the best case, by 2030 all children will have the opportunity to attend school and a growing number of young people will attend a secondary school or a university. Within about half a century Ethiopians would then be as well educated as Europeans are now. The population would continue to grow in this scenario; this is because of the currently

very young population, which means that the demographic transition will take some time. But there would be “only” 150 million Ethiopians in 2060. By this time the number of children per woman would have fallen to its current level in Europe, so that an end of population growth in Ethiopia could be achieved by 2075.

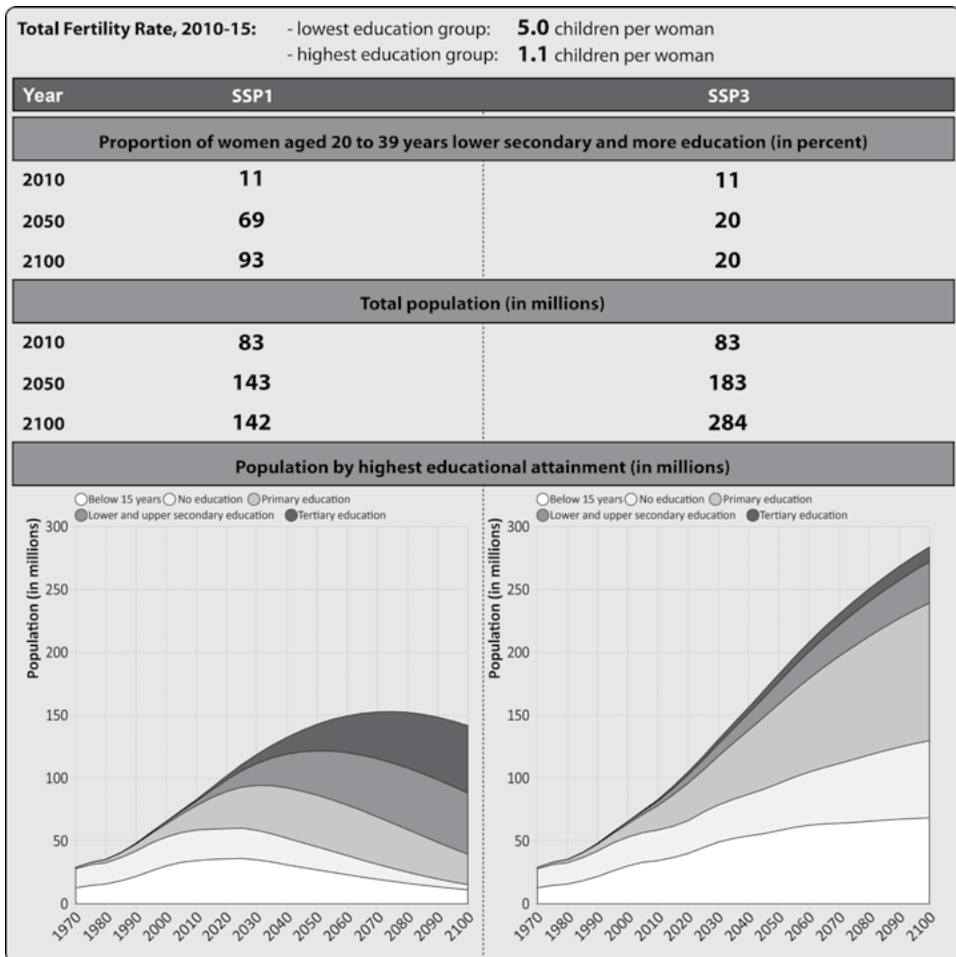


Figure 6 Ethiopia

In the other, much worse scenario SSP3, the successes of the previous expansion of education would not be lost for the affected cohorts. But for the ever-increasing successor cohorts, there would be no improvement. This would mean an increase in the absolute number of young people without any education. Under these conditions the fertility rate would only slow down to about 3 children per woman by 2060, and as a result in an overall increase in the population to 208 million. At the end of the century the population of Ethiopia would reach 284 million in this scenario, i.e. exactly twice as large as in the case of SSP1 with 142 million.

The spread of education and healthcare would have a considerable impact. Today about 5 percent of all children of a cohort die before they can celebrate their fifth birthday – that is 144,000 children per year. In all likelihood the infant mortality rate will decrease in the future, but how many of these deaths can be avoided in the future crucially depends on education. A recent study estimated that, if all other conditions remain stable, a very rapid expansion of education would mean that in 2060 only 24,000 children die – similar to what was experienced by the once very poorly developed countries of Singapore and South Korea.¹⁰ Under the opposite assumption, i.e. no new schools are built in Ethiopia as of next year, one could expect up to 80,000 (in principle preventable) deaths of children. Both are admittedly extreme scenarios, yet within the realm of possibility.

Because health particularly affects life expectancy, this is another area where the two scenarios for Ethiopia show big differences. In the case of SSP1, it would rise from the current 60 years to 84 years in 2060, and would thus be slightly higher than in Germany. If Ethiopia develops according to SSP3, life expectancy would remain virtually unchanged at the present level.

Similar disparities exist with regards to economic development. Under the favourable scenario of rapid socio-economic progress, the gross domestic product of Ethiopia, adjusted for purchasing power, could increase by a factor of 12.5 until 2060. Considering the growing population, every Ethiopian would earn on average seven times more in 2060 than today.¹¹ The economy would even grow under the conditions of stagnation scenario SSP3 – but only by a factor of 3.7 until 2060. But because of the population growth at the same time, the real per capita income would only increase to a very limited extent within half a century. The differences are even more dramatic if this development is maintained until the end of the century.

What the future will look like is of course uncertain, despite all the scenarios. What is certain is that the lives of Ethiopians tend to deteriorate under SSP3 conditions. Slow or stagnant development may increasingly frustrate the growing population, as in the era of the internet developments in other parts of the world will unlikely go unnoticed. Political crises, problems in adapting to climate change, religious and ethnic conflict, violence, displacement and refugee flows would be likely to follow.

10 KC, S. et al. (2014): Reducing vulnerability in critical life course phases by enhancing human capital. In: *Safeguarding Human Progress: Reducing Vulnerabilities, Building Resilience, United Nations Development Programme*, New York: Human Development Report Office, pp. 151-194.

11 International Institute for Applied Systems Analysis: SSP Database. <https://secure.iiasa.ac.at/web-apps/ene/SspDb/dsd?Action=htmlpage&page=countries>

Nigeria – fragile oil giant

By far the most populous country in Africa, Nigeria had an estimated 45 million inhabitants in 1960, the year it proclaimed its independence from Britain. It was home to over 300 ethnic groups and minorities, who had little in common except for their history under British colonial rule. The young country was a typical post-colonial construct; in the early years it was considered more or less ungovernable because different peoples fought for supremacy. Soon, the south eastern province of Biafra, situated in the oil-rich Niger Delta, tried to secede. In 1967 the secessionist movement culminated in the Biafran war, in which both sides were massively supported with arms by foreign countries. During the bloody confrontation an estimated 500,000 to 2 million people starved to death and 100,000 died in the war and the massacres, before the secessionists surrendered in 1970 and Biafra became part of Nigeria again.¹²

Nigeria has not found lasting peace ever since. To this day the state structure suffers from various ethnic and sectarian armed conflicts. The country is economically, politically, socially and religiously divided like no other. On the one hand, Nigeria has become the largest economy in Africa, but a small upper class reaps the benefits therefrom for the most part. For another, less than half of the rural population has access to clean drinking water. 80 percent of the revenue from the oil business are earned by 1 percent of the population. These people usually send their children to expensive private schools abroad, eroding the country's education system. School buildings decay, teachers are underpaid and curricula are outdated. The health system, is run down. Life expectancy among Nigeria's population is as low as 52 years for men and 53 years for women; six and seven years, respectively, less than the African average which is comparatively low anyway. Worldwide, people on average live 19 years longer than Nigerians.

Although the nation has more than 700,000 square kilometres of usable farmland and two thirds of Nigerians work in agriculture, productivity is so low that Nigeria has to import 4 million tonnes of wheat per year¹³ and is the second largest rice importer in the world.¹⁴ Nigeria also ranks as the tenth largest oil producer in the world. Income from oil sales accounts for over 90 percent of its export business and more than 70 percent of government revenues. The country is heavily dependent on

12 New World Encyclopedia: Nigerian Civil War. http://www.newworldencyclopedia.org/entry/Nigerian_Civil_War#cite_note-4

13 Food and Agriculture Organisation of the United Nations (2011): Top imports Nigeria 2011. <http://faostat.fao.org/desktopdefault.aspx?pageid=342&lang=en&country=159> (accessed on 02-08-2015).

14 International Rice Research Institute (IRRI) (n.d.). Trends in global rice trade. <http://irri.org/rice-today/trends-in-global-rice-trade>

the oil price, which has fallen significantly in the recent past. Economic growth in recent years has on average amounted to 5 percent only, which is a fairly low figure for a developing country.¹⁵

The difficult economic and social situation is a reflection of the educational environment and population development. During the time of the Biafran War the number of children per woman was 6.6 and 90 percent of adult women had no education. Today Nigerian women still have 5.5 children. The very slow decline in fertility rates alone is a testament to the weak socio-economic development of the country, which now has to feed some 190 million people – more than Germany, France and Poland combined.

Nowadays women with no education have on average 6.7 children, those who are better educated have 3.0 children. The high population growth will certainly continue for some time, because 43 percent of adult women have still never attended school. Among young women aged between 20 to 24 years of age, the share has dropped but still amounts to 21 percent. Here too we can see a divided society, since 38 percent of women in this age group now have a higher secondary education and 8 percent a tertiary education.

In a country like Nigeria such a dynamic population growth, what may long-term development look like? Again, let us consider the various SSP scenarios to gauge developmental pathways for the future (see Fig. 7). In view of the continually high number of children and the unusually young population, it is very likely that population growth will remain at high levels in any event. Even in the optimistic SSP1 scenario, the population would increase to 333 million by 2050 and to 439 million by the end of the century, which amounts to two and a half as many people as today.

Developments on the ground suggest that the SSP1 scenario is unlikely for Nigeria, however. Education would have to spread very rapidly at all levels and economic policy would have to promote innovative industries, because drawing revenues from oil sales is not an option in the context of the climate-friendly SSP1 scenario. The country would have to stabilise politically and benefit from good international relations. Nothing points to the fact that this will happen. But if the government actually managed to put the country on this path, Nigeria could rise to an important global power by mid-century, owing to a much better educated population and a growing economy.

15 Barungi, B. et al. (2015): African Economic Outlook. Nigeria 2015. http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2015/CN_data/CN_Long_EN/Nigeria_GB_2015.pdf

Nigeria's future looks quite differently under the assumptions of scenario SSP3. Education would not spread any further, the number of people without schooling would rise significantly as a result of high fertility rates. Social and economic development would come to a halt and the population would reach 435 million in 2050 (Nigeria would then have the third largest population in the world after China and India) and increase to 879 million by the end of the century. This would amount to a population higher than the number of people currently living in the EU and in the US combined.

The figures also attest to the limits of projection models. Because in the event of SSP3, a number of feedback effects would take hold, inhibiting such a tremendous population growth in the most terrible way. It would be quite difficult under preexisting conditions to provide food, energy, drinking water and health care for such a large population. Global climate change, which is going to have substantial consequences by the end of the century, will worsen living conditions even further. Millions of Nigerians would die. A minority who could afford to do so would seek their fortunes elsewhere, in more developed African countries or in the last wealthy oases in Europe, Asia or America. But in the worse-case scenario, the latter countries would have already sealed off their borders by then, abandoning the world's poor to their own fate.

Apart from that, the already massive conflicts between the predominantly Christian south and the largely Muslim northern Nigeria would probably escalate. The north is much poorer than the south, ill-equipped with any kind of infrastructure, including schools. Girls are less likely to learn how to read and write than in the south and they marry earlier (or are married off) and have more children. Population growth in the north (with coincidentally weak income opportunities) generates a breeding ground for discontent and radicalisation of the population. It is precisely under these conditions that the Islamic terrorist group Boko Haram has evolved. The worst-case scenario would offer these religious fundamentalists the best possible conditions for the propagation of their ideology. They count to the few beneficiaries of this horror path into the future and could cast half of Africa into the abyss.

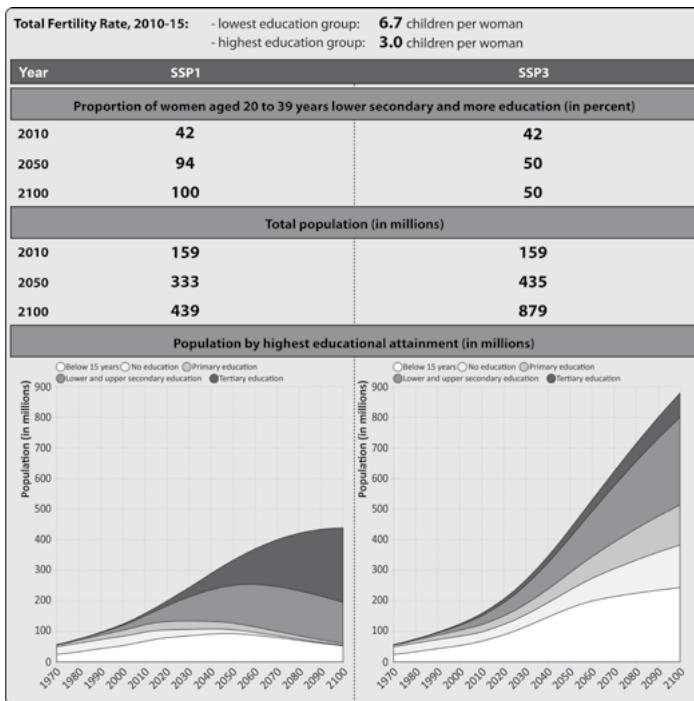


Figure 7 Nigeria

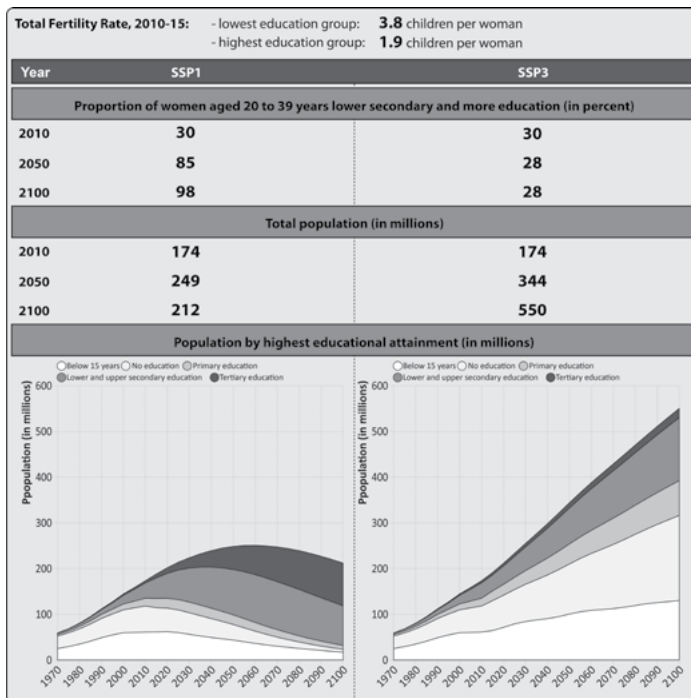


Figure 8 Pakistan

Pakistan – powder keg in the Hindu Kush

The home of Nobel Prize winner Malala Yousafzai has one of the worst education systems in the world. This harsh judgment was passed by no other than the UN educational organisation UNESCO. Pakistan has the second highest number of children who do not attend school worldwide, of which two thirds of them are girls. Ideally, the Islamic Republic of Pakistan should provide adequate education for around a quarter of its population – 52 million children between the age of 5 and 16. Clearly, however, the country is not even close to doing so. In the Education for All Development Index of UNESCO, Pakistan ranks 113th out of 120 countries.¹⁶

A local education report paints yet another terrible picture: approximately half of the 10-year-olds have reading and writing skills in the national language Urdu that correspond to the level of a 6-year-old. The results are even worse for the official language English. In arithmetic half of the 10-year-olds achieved the performance level of 7-year-olds. Half of all state schools have no electricity, 36 percent have no drinking water, 42 percent no functioning toilets.¹⁷

According to UNESCO, the situation in rural areas is extremely alarming – especially so in the northern provinces, where cultural and social barriers to education are particularly pronounced. In many cases girls are strictly prohibited for “religious” reasons from going to school. In these areas extremist groups such as the Taliban are de facto in charge. Between 92 and 97 percent of women are illiterate. All through the country exist education deficiencies. That can also be observed in the adult population at large: about half can neither read nor write, women make up two thirds of that group. 69 percent of women cannot participate in the labor market (same figure for men: 8 percent). One reason is the lack of basic education. yet another is the fact that women are not tolerated in public life.

The fact that Pakistan has one of the highest population growth rates in all of Asia stems from its disastrous educational situation. Since its independence in 1947, the number of people has increased from 38 to 190 million. Former East Pakistan, which became independent in 1971 after a bloody civil war and is now called Bangladesh, is not included. Since then Pakistan has repeatedly experienced short democratic phases, which usually ended in corruption scandals and with military coups. To date the political situation is extremely fragile. According to estimates, more than 80,000 Pakistanis became victims of armed conflicts, terror and violence

16 UNESCO (2012): Education in Pakistan. http://en.UNESCO.org/gem-report/sites/gem-report/files/EDUCATION_IN_PAKISTAN__A_FACT_SHEET.pdf

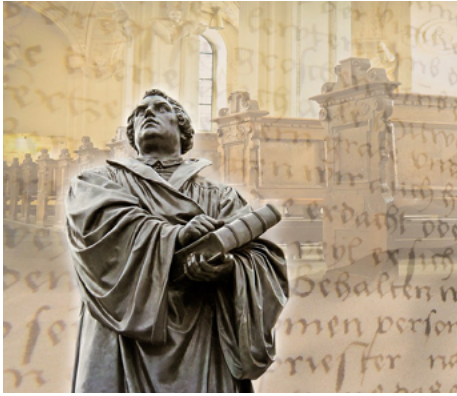
17 ASER Pakistan (2015): Annual Status of Education Report 2015. <http://www.aserpakistan.org/>

between 2004 and 2013.¹⁸ Especially in the northern provinces, where the attack on Malala Yousafzai took place and the level of education is lowest, assassinations and massacres of the civilian population occur repeatedly.

Although the level of education in Pakistan has improved gradually, as anywhere in the world over the years, and intellectual elites have emerged, too – among adult men, 8 percent have a college degree and among women at least 4 percent – in international comparisons the country's education level is still extremely poor. Forty-two percent of young women aged between 20 to 24 years have never attended school. This is the lowest rate in the whole of Asia, as far as data is available. For countries such as Afghanistan, where the situation is likely to be worse, no reliable information exists. Hence, Pakistan performs poorly even when compared to Africa.

At the same time birth rates in Pakistan are still quite high by Asian standards with an average of 3.3 children per woman. Uneducated women have 3.8 children, women with a university degree on average only half as many. Therefore the future of Pakistan depends to a large extent, as with all underdeveloped countries, on the further expansion of education. In the optimistic scenario of rapid socio-economic development in SSP1, the number of Pakistan's population is expected to grow moderately, from 190 million today to only 249 million in 2050. Under the tenets of SSP3, a population of 344 million is projected for 2050, 550 million even for 2100. That would be more people than currently living in the entire EU. With this growth, however, the educational system is unlikely to keep up. Thus, the number of illiterate adults who have never attended school would probably rise from 36 million women and 24 million men today, to 116 and 71 million, respectively. As in the case of the SSP3 scenario for Nigeria, however, it is inconceivable that over half a billion barely educated people can survive in Pakistan.

18 IPPNW Germany et al. (2015): Body Count. Casualty Figures after 10 Years of the “War on Terror”. Iraq. Afghanistan. Pakistan. http://www.ippnw.de/commonFiles/pdfs/Frieden/Body_Count_first_international_edition_2015_final.pdf



8

WHAT TO DO?

An education agenda for the 21st century

Humanity – currently numbering 7.5 billion, but soon to reach 8, 9 or 10 billion – has to confront titanic tasks in the 21st century. It must overcome poverty and hunger, satisfy the raw material needs of a growing global middle class, tackle climate change and win the fight against terrorism, to name just a few of the major challenges. It will not succeed in these endeavours as long as 58 million children of primary school-going age do not attend school, more than 200 million people are unemployed and 780 million illiterate adults remain excluded from any participation in the global information society.

As long as the education gap between the developed and the developing part of the world is not closed, millions of people are threatened by a future of hardship and misery. And this future will be even worse than what is nowadays regarded as terrible. It also poses great dangers to the wealthier part of humanity. Education for the whole world's population is the central task for the coming years. Whether it is properly achieved or not will have serious consequences for the rest of the 21st century.

It is not as if the world community, international organisations or individual governments have not recognised this problem. Worldwide, the fundamental human right to education is enshrined in laws and treaties. Only the most oppressive regimes such as the so-called Islamic State, the Taliban or Boko Haram have made ignorance and the immaturity of their citizens political ideals. In 2000 the United Nations proclaimed a completed, four- to six-year primary education (depending on the country) for all children as one of its Millennium Development Goals (MDGs).

But in 2015, the target year for achieving these great intentions, the results are so disappointing that UNICEF, UNESCO and other international organisations declared they represent “broken promises”.¹ Although many countries had initially made good progress following the declaration of the MDGs and the number of children at primary school age not enrolled had fallen from around 100 to 60 million by 2007, there was no further global progress after that. The successes were mainly due to improvements in Asia, while the situation in Africa had changed very little. Since 2010 the number of children not attending school has even increased. The overwhelming majority of these children are girls.²

Therefore the United Nations again advocated improvements, which are anchored in the so-called Sustainable Development Goals (in short SDGs), the successor goals of MDGs, which are much more ambitious. By 2030 all girls and boys worldwide should already learn to hone their curiosity in preschool classes to thus prepare them for the reception of school knowledge. They should all get a quality basic education in primary school, i.e. learn to read, write and calculate, and then attend a secondary school. This should enable the acquisition of essential skills, which would then prepare them for their professional lives, either within the framework of a technical/vocational training or higher education, which should be accessible for all. All people should be given opportunities for lifelong learning to enable them to keep their skills up to date in a rapidly changing information society.

Whether it makes sense to set such high goals remains to be seen, because the more unrealistic they are, the sooner they lose credibility. Indeed, the Sustainable Development Goals have been massively criticised, because, in endless negotiations, they increased in number to 169 sub-goals in 17 topic areas, ranging from gender equality to the fight against illicit monetary flows. The goals were discussed in hundreds of forums in all parts of the world and ultimately defined in probably the largest consultation process of human history. Inevitably, a very long wish list developed on which all stakeholders could place their respective favourite topics.

1 UNESCO Institute for Statistics (2015): *Fixing the Broken Promise of Education for All. Findings from the Global Initiative on Out-of-School-Children*. Montreal: UNESCO Institute for Statistics.

2 UNESCO Institute for Statistics (2015): *Fixing the Broken Promise of Education for All. Findings from the Global Initiative on Out-of-School-Children*. Montreal: UNESCO Institute for Statistics.

How the Sustainable Development Goals can be implemented in practice will become evident in the next few years, especially since the decision as to which goals are given priority rests with national governments. Especially in the field of education, many experts consider the goals too ambitious: to provide all young people worldwide with high-quality schooling of approximately twelve years by 2030 seems impossible, at least by conventional standards. Since the least developed countries cannot train the necessary teachers fast enough, they would have to import teachers or establish new, electronic media for teaching. But as we have shown in previous chapters, universal school attendance up until the age of 15 or 16 years, i.e. a completed lower secondary education, is already a very good tool for development. In order to see real successes by 2030, it would make more sense to target this goal first, which already represents an enormous effort for the least developed countries. Without international aid, they are unlikely to achieve the goal.

Does aid help at all?

The crucial question with all these good intentions is: How can these demands, which have been expanded considerably compared to the initial goals, be put into practice, against all the odds described in this book? What does this cost and who should raise the necessary funds? And is it at all constructive if poor nations receive external help from so-called donor countries?

The last point has been the subject of fundamental discussions in development cooperation. In the last few years it has been quite controversial to decide whether the developed world should advise poor nations and provide financial and technical support – or whether these countries should relieve poverty on their own and with their own ideas, and thereby find a way that is tailored to their particular circumstances and allows them to preserve their identity.

One camp in this dispute is represented by the American economist Jeffrey Sachs, director of the Earth Institute at Columbia University, who worked as a special adviser to the United Nations and played a key role in the formulation of the Millennium as well as the Sustainable Development Goals. He argues that development cooperation has achieved a great deal in recent years, and that it could achieve much more with additional money and improved methods.

The opposite pole to Sachs is represented most prominently by William Easterly, also an economist who teaches at New York University and has gained experience and expertise on these issues as a scientist at the World Bank. Easterly does not believe in the well-intentioned aid of rich countries, because they force their ideas and concepts on poor countries, which he sees as partly self-serving and often even

harmful. Nor does he think highly of musicians such as Bob Geldof and Bono, who collect millions with Live Aid concerts in order to randomly distribute the money without a plan among diverse relief projects. According to Easterly, this is a modern continuation of top-down-colonialism. This form of aid only promotes dependence and corruption. The biggest problem of underdeveloped countries is, according to Easterly, that the poor have no rights. The title of one of his books expressed quite radically and clearly what he means: *The Tyranny of the Experts: Economists, Dictators and the Forgotten Rights of the Poor*.³

Indeed, Easterly shows with extensive statistics that many of the successful emerging economies mastered their rise without external help and, as he writes, exactly because they did not receive any aid – especially China, which liberated 300 million people from extreme poverty in just two decades. In contrast, many African countries have been passed from one drip-feed of aid to the next and have still not developed further.

Our position in this book lies somewhere inbetween these two American economists. We concur with William Easterly that it is better to encourage people as individuals instead of supporting governments or bureaucracies. But we agree with Jeffrey Sachs that global solutions are needed to resolve major global challenges and it is for that reason that the rich countries must help the poor to increase their capacity, or, expressed economically, their human capital. As we showed in the previous chapter there is no time to waste. Only through international aid for universal education can people be empowered to solve the problems of their countries on their own, while respecting their identity.

External help is thus an essential part of the solution for some countries, but may not be needed for others. In countries such as Finland, Japan or Singapore responsible elites once promoted the education of broad social classes actively and with great success. In these cases foreign support was unnecessary. There are other parts of the world where international support would be desperately needed but is not welcome, because those in power decidedly oppose the spread of education. This was the case in Afghanistan under the Taliban, and it is the case now in those parts of Syria, Iraq, Libya, Nigeria, Somalia, Pakistan and Yemen, which are under the influence of radical terrorist regimes that are hostile to education.

But aside from these two groups of countries, there are two other groups for which international support would likely make the decisive difference for finally spreading mass education. These are, on the one hand, countries like Ethiopia or Mozambique, which have recognised the value of education, but where the means

3 Easterly, W. (2014): *The Tyranny of Experts: Economists, Dictators and the Forgotten Rights of the Poor*. New York: Basic Books.

for rapid and high-quality development of educational infrastructure are still absent. And then there is the large number of countries whose governments do not oppose education in principle, but regard other investments such as roads, power plants and improvements in agriculture as more important in the short term. They would be open to international aid in education, if offered, and could thus reap the manifold benefits of mass education much more rapidly than without such aid.

There are two good reasons why the wealthy part of the world should not just observe the development in poor countries, but actively support it. They are, first, humanitarian or ethical reasons: whoever is, for whatever reasons, better off and considers human rights important has the duty to support those who are trapped in a worse situation. Secondly, there are also selfish reasons to help the poor part of the world. In a globalised world big problems do not remain restricted to national boundaries. Especially the industrial nations should have a serious interest in maintaining political stability in less developed countries to keep possible refugee flows low and to control the spread of terrorist gangs.

The battle of education cultures is far from decided yet. If the expansion of education stagnates in the least developed countries, or radical forces prevent girls from attending school, birth rates will remain high and these countries will remain trapped in a cycle of population growth, poverty and ignorance. It is hence also in the interests of rich countries to prevent the poor countries from drifting into an even more difficult situation.

Sola schola et sanitate, or education and health first

We believe that this can best be done through investment in basic education and basic health. Such aid does not dictate what people should do. It does not force them into a Western or otherwise biased system. By acquiring basic skills and reducing diseases that limit their capabilities, people are empowered to take their fate into their own hands and to develop their country through their own power (as William Easterly demands). If governments cannot provide the necessary public resources, or if they do not give the necessary priority to education and health, the international community must step in to support them (as Jeffrey Sachs demands).

That an education revolution can, in principle, function without external help is a well-known fact since Martin Luther's (education) Reformation. Although the conditions in medieval Germany are not comparable to those of today's world, with his persuasiveness alone Luther gave sufficient impetus to spread education, which had until then been reserved for the elites, among the broad mass of the population. He explained his demands for church renewal in his *sola* principles, written in Late Medieval Latin. With the formula *sola scriptura*, "only through scripture", he meant

that only the Bible and not ecclesiastical doctrine should serve as a guide for the faithful. *Sola fide* meant that people could find access to salvation “only through faith”. And *sola gratia* indicated that salvation was possible “only by the grace” of God. Not by selling and buying indulgences.

To transfer these Reformation principles into the modern era – to credit Luther, in a sense, with the idea of a new education revolution – the formula *sola schola et sanitate* would be appropriate.⁴ It means that such a revolution is possible “only through education and health” as an aid to empowerment to ensure a just participation in the world of the 21st century for all people.

For this second education revolution rapid, global, concerted action by governments, corporations and philanthropists who would pool their resources in a global fund for education would be necessary. The aim of this fund should be less extensive than the overly ambitious UN wish list of the sustainable development goals and focus on providing all children of the world with a good education at least up to the lower secondary level, i.e. until the age of 15 or 16 years.

This sort of global ad hoc initiative is not new. In terms of this model the international community has made great strides in the last 15 years in the field of health, and infectious diseases such as malaria or AIDS could at least be kept in check. Some countries, including the USA, UK, Norway and Sweden, have joined forces with the Bill and Melinda Gates Foundation and major companies such as the pharmaceutical giant Novartis and the Swedish telecommunications company Ericsson to ensure that people in poor countries have access to life-saving vaccines and drugs. The initiative has saved hundreds of thousands of lives and helped people to become productive members of society again.

Where is the great, global education alliance?

A similar global initiative in the field of basic education has not yet been launched, but is urgently needed. In contrast to their massive campaigns for promoting health in developing countries, the Gates Foundation promotes education only within the USA. Other potent foundations that would promote a global education revolution are not yet in sight. There are no multinational corporations with a direct commercial interest in education, or pharmaceutical companies in the case of health. Even large organisations and experts on international development cooperation often feel more committed to an improvement of medical care rather than to promoting education. The commitment to health can be sold more easily on humanitarian grounds, especially since the effect of such aid is often directly visible. People

4 Lutz, W. (2009): *Sola schola et sanitate: Human capital as the root cause and priority for international development? Philosophical Transactions of the Royal Society, Series B*, 364 (1532): 3031-3047.

from rich countries happily and often donate a lot of money for relief in disaster situations, for the hungry, for refugees or for the sick, but they hardly ever do so for a functioning education infrastructure. Massive action as in the years 2014/2015 for the fight against the Ebola epidemic in West Africa, which claimed more than 11,000 victims and for which the World Bank alone spent US\$ 1.6 billion, can hardly be expected in the education sector.

As necessary as the Ebola emergency aid was, it is short-sighted to withhold such efforts in the field of education, because the latter is a prerequisite for virtually all aspects of development including health. In the fight against Ebola, for example, it is vital to isolate and treat infected people quickly. People need to know how to behave, that they must not hide a sick relative or touch the dead; they need to understand relationships and they need functioning health services and trained medical staff. In short, they need an educated society to contain such an epidemic as quickly as possible. This knowledge was the reason why Ebola did not spread in the industrialised nations, although there had been cases of introduced infections. These countries could prevent the infection of large parts of the population only because of their high levels of education.

In order to achieve a global education alliance, private foundations and governments must be mobilised both in the poor and the rich countries. It is not just about money, but also about the belief that education is the key factor for development. Even large corporations in the information sector, such as Google, Apple, Oracle, SAP, Microsoft and Samsung, should have a massive interest in guaranteeing that as many people as possible learn how to read and write. It is only then that they can become potential users and clients of their products and services.

But the hope that there will be a grand coalition that believes in the success of education and raises significant amounts of money for this purpose⁵ has recently been shattered again. At the global conference on “Financing for Development”, which took place in July 2015 in Addis Ababa, Ethiopia, delegates discussed everything but the centrality of education for development. In the final document of the conference, education is mentioned as only one of many concerns – one of various aspects of social progress. Unlike the experts from UNICEF and UNESCO, who have endeavoured for many years to place a higher priority on education, people directly involved in development cooperation work are far less convinced. The “*sola schola et sanitate*” principle has not yet become prominent enough in international debate.

To change that we need public national and international debate. In these debates participation must include not only the representatives of development and

5 Sachs, J. (2015). Financing Education for All. Project Syndicate, 19 March. <https://www.project-syndicate.org/commentary/financing-universal-health-education-by-jeffrey-d-sachs-2016-05>

education policy, but also representatives of foreign, economic and security policy. Everyone is affected if poor countries remain poor, if radical, groups hostile to education spread and entire states collapse. Even science, business and civil society must be involved in this issue, because it is central to the future of humanity.

The means necessary for a new global education revolution are downright modest: UNESCO has identified an annual funding gap of US\$ 22 billion. This sum would be needed to enable all young people in countries with low- and middle-income levels to obtain a quality education at the pre-school, primary and lower secondary level. Compared with the military spending of many countries, this is a ridiculously small amount. The US Nobel laureate in Economics, Joseph Stiglitz, estimates the costs of American military intervention in Iraq, incurred within the USA alone, at US\$ 3,000 billion.⁶ With a tenth of this figure the cumulative cost of education in developing countries could be financed up until the year 2030. Even sporting events receive more money than would be necessary for global basic education. For instance, the oil sheikdom Qatar invested an estimated US\$ 200 billion in the infrastructure for the World Cup 2022, to be held in twelve stadiums in the desert of Arabia;⁷ US\$ 150 million alone was allegedly been invested in bribing Fifa officials.⁸

A global education revolution is not about improving enrolment rates on paper in order to satisfy international donors; it is about the quality of education. This must primarily be understood by the responsible actors in the less developed countries, because only when the schools and universities in these countries can really make people fit for the challenges of the 21st century will they be able to escape from the cycle of illiteracy and poverty. The emerging economies in East Asia have not overtaken sub-Saharan African countries economically only because their children stay in school longer, but because they learn so much in the same period of schooling that they are four years ahead of African children in terms of educational outcomes. This is shown by comparative competence studies that measure basic knowledge in mathematics and science.⁹

6 Stiglitz, J. and Bilmes, L. (2008). *The three billion dollar war: The true cost of the Iraq conflict*. New York: W.W. Norton.

7 Bloomberg Business (2015): FIFA Graft Probe Threatens New Scrutiny of Qatar's World Cup. <http://www.bloomberg.com/news/articles/2015-05-27/qatar-200-billion-world-cup-under-more-scrutiny-amid-fifa-probe>

8 Ross, B. et al. (2015): FIFA Officials Arrested Over Alleged 'Rampant Systematic' \$150M Bribery Scheme. ABC News, 27.05.2015. <http://abcnews.go.com/Sports/fifa-officials-arrested-federal-corruption-investigation/story?id=31326400>

9 Wössmann, L. (2015): Wissen und Wohlstand der Nationen. *Frankfurter Allgemeine Zeitung*, 18 May. http://www.cesifo-group.de/de/ifoHome/policy/Staff-Comments-in-the-Media/Press-articles-by-staff/Archive/Eigene-Artikel-2015/medienecho_ifostimme-faz--18-05-2015.html

Finally, politicians in power need to display a quality that is very rarely encountered in politics: patience. Education costs money, is highly valuable, but shows success only in the long term. It takes several years until better educated children enter the workforce and make the investment in education economically noticeable, until they improve the living conditions of their people or contribute to democratisation. But this time lag between investment and profit cannot be circumvented.

Nevertheless, act immediately

But precisely because the success of education initiatives does not happen overnight, one must act quickly. Each additional delay, during which people fail because of a lack of education and the situation of entire countries deteriorates, causes a growing risk for crises of all kinds. In the following section we describe twelve factors where politics needs to set the right priorities and indicate how the general discussion process can be steered in a direction that places greater importance on education.

1. Education begins before schooling

All countries in the world should take note of the scientific findings of neurobiology, psychology, linguistics, sociology and economics, which state that the learning experiences of early childhood have a sustained impact on the further development of a human being. The first years of life, during which the brain of a child matures, are crucial for the future benefits that this organ may bestow on its owner. Problems in early childhood development can hardly be remedied in later stages of life, even through intensive training. The German Academy of Sciences Leopoldina hence concludes that investment in high-quality early childhood education and care are important and profitable for both the individual child as well as for society as a whole.¹⁰ Investments at the beginning of the child's educational career provide the highest fiscal returns. Generally, this commitment to education for children not only involves a preparation for formal education, but also the acquisition of social and emotional skills and personal behaviour control, so-called self-regulation skills. This involves the ability to process emotions, to develop a tolerance of frustration, to act purposefully and hold back on short-term satisfaction in favour of long-term goals.

In most developing countries there are massive deficits in almost all aspects of early childhood education. This applies to the cognitive early support in pre-schools and kindergartens. In addition, children suffer from bad medical supplies or lack sufficient and high-quality food, so that their young bodies and especially their

10 German Academy of Natural Researchers Leopoldina et al. (2014): *Socialisation in early childhood: Biological, psychological, linguistic, sociological and economic perspectives*. Halle (Saale): Deutsche Akademie der Naturforscher Leopoldina, acatech – Deutsche Akademie der Technikwissenschaften, Union der deutschen Akademien der Wissenschaften.

brains cannot develop optimally. But even in the richest countries, early childhood education is often deficient. Many children are oversupplied with consumer goods, enjoy too little active movement and have no opportunity to train their sense of balance and body awareness, which are in turn important prerequisites for mental development.

A problem in developed countries is that the medical aspects of early childhood development are often regarded separately from the social, emotional and cognitive aspects. While for the former there is usually an effective system of early support and treatment, the latter do not enjoy widespread support and promotion by public authorities.

In this respect, the Finnish Neuvola system (meaning “advisory” system and described in Chapter 3 of this book) is a pioneering achievement. From the beginning of pregnancy up to primary school age children are provided with free medical care, educational counselling and regular check-ups of their mental development, carried out by qualified personnel in local health centres. Neuvola guarantees equal opportunities and ultimately economic success. In 1944 Finland introduced the system nationwide.

Early childhood care and education programmes especially help children with disadvantages, i.e. children from poor and so-called educationally disadvantaged households. This applies not only to rich Finland, but also to less developed countries, for example rural Bangladesh. There local NGOs established 1,800 preschools. On average, the children who have been supervised are, once they enter the second grade of elementary school, better at talking, reading, writing and arithmetic than their peers who did not attend pre-school.¹¹

2. At least ten years of school for all

As long as the basic demand of the Millennium Development Goals, approved in 2000, is not met, the need remains acute: all children of the world need to get a basic education. Especially the governments of affected countries are required to act on this central point. They are obligated to offer this minimum opportunity to their children, boys and girls, even in remote rural areas. At the same time parents should be encouraged to let their children go to school rather than have them stay at home to work in agriculture, in mines or factories. Here, conditional cash transfers have proved successful. These by now globally extended programmes provide food aid or cash to poor families, if their children attend school or are vaccinated. The

11 UNESCO (2015): *Sustainable Development begins with Education*. New York: United Nations.

programmes are successful mainly in rural areas. They cost little, are linked to clear rules and are a good investment in future generations.¹²

Simultaneously, keeping the promise to have all children of the world attend primary school must lead to the insight that this is merely a foundation for their further development. Literacy is not enough for a person or country to be globally competitive. A young person in Africa does not only have to be economically competitive in their regional African environment, but also in the highly networked markets of the global information society. The aim of any development initiative must be to reduce the economic, income and wealth inequalities in the world.

In order to sufficiently develop the intellectual skills of each child, at least a lower secondary education is necessary. The “Education for All” report of the UN Educational Organisation UNESCO therefore demands that children and young people not only acquire basic skills such as reading, writing and arithmetic, but also key skills such as the ability to think critically, to solve problems and conflicts, and to become responsible world citizens.¹³ This would represent a holistic and practical education, which most children in developing countries can only dream of. It would require, especially in rural areas where the majority of poor people live in large families, that secondary schools are built and provided with new teachers and modern curricula. Equally challenging is the task of convincing parents of the purpose of these schools.

For good reasons schooling and education are obligatory in virtually all developed countries for at least ten years. Parents who fail to adhere to this obligation are liable to prosecution. Why should a measure that has been recognised as good and important in rich countries not also be put into practice in all other countries in the world?

3. More and better trained teachers

No factor increases the learning success of children more than good, motivated and motivating teachers. But in poor countries the teaching staff has to cope with classes of 43 children on average. Payment and control of teachers is usually so poor that they often do not even appear for duty. Many teachers do not even have higher education qualifications, let alone a teaching degree. In 48 countries of the world teachers for the lower secondary level also only need a lower secondary education as training. This means that they are as well qualified, at best, as their students will be. Moreover, these countries lack female teachers who could serve as role models

12 *The Economist* (2010): Give the poor money, 29 July, <http://www.economist.com/node/16693323>

13 UNESCO (2014): *Education for All. Global Education Monitoring Report*. Paris: United Nations.

to the pupils. The responsible governments must therefore put much more effort into recruiting and training qualified staff.

4. Education losers must be given a second chance

Many children in poor countries will either not go to school or drop out before the completion of primary school. They are forced to start working at a young age, their family circumstances do not allow them to go to school, or they will be forcibly prevented. These kids need a second chance. For this purpose special programmes have been established in several Latin American and Asian countries. Young people receive a three-year alternative-qualification, which is followed by vocational training. After that they often escape the danger of slipping into economic insignificance in their future life. These programmes should be extended especially to those countries where there are many education losers.¹⁴

5. Support marginalised groups

While certain countries and regions of the world are at a clear disadvantage in terms of education, the same is true for specific segments of the population in many countries. These marginalised groups are education losers even in an environment that actually provides good starting chances. This is the case in many Arab countries for children from poor families. In Oman, for instance, one of the richest countries in the world, poor children on average only achieve the same learning standards as their peers in the West African developing country of Ghana. In Eastern Europe Roma children are education losers and in the biggest EU countries, Germany, France and the UK, children from immigrant families perform significantly worse than those of the native population. In France, for instance, immigrant children only achieve the same level of performance as students of the same age in Mexico. That there is another way is demonstrated mainly by East Asian countries such as South Korea, Japan or Singapore, where it is possible to offer a consistently high quality of education to children and young people regardless of their social background.¹⁵ In all cases, the state provides active social support to disadvantaged children and has hence proven that inclusion is possible.

6. End discrimination against girls

The most disadvantaged group worldwide is girls who are prevented for social or supposedly religious reasons from equal schooling. Discrimination against girls and women, and thus in some countries the marginalisation of half the population, is probably the biggest obstacle to the development of humankind. In the affected

14 UNESCO (2014): *Education for All. Global Education Monitoring Report*. Paris: United Nations.

15 UNESCO (2014): *Education for All. Global Education Monitoring Report*. Paris: United Nations.

countries development cooperation must highlight the economic benefits of equal access to education for both sexes at all levels. Grants must be linked to gender equality. Women without education can hardly enter the labour market, whereas the chances of obtaining a job and a decent income increase directly with the level of qualification. Particularly disadvantaged are those nearly 3 million girls in sub-Saharan Africa, in West and South Asia, who are already married at the age of 15. This is especially true for girls who never attended school. Because education is the best insurance against forced marriages, UNESCO estimates that the number of child marriages could be reduced to 1 million worldwide simply by attending a secondary school.¹⁶

7. Make use of innovations

Just as Martin Luther's first education revolution was made possible only with the new technology of printing, today the Internet can provide knowledge almost for free in every remote corner of the earth and thus initiate the final democratisation of education. This digitisation, which revolutionised the entire industry culture anyway, offers enormous, hitherto largely untapped potential for the spread of education. Why should people in remote and economically stalled parts of Africa wait for their governments to build schools and train the teachers who are needed for the teaching of many children, when a mobile network can do the same much faster and cheaper? Many children would anyway prefer to learn basic arithmetic or spelling with a creative computer game than from an incompetent teacher. The Microsoft founder and philanthropist Bill Gates believes that educational software will become so cheap and good in the next 15 years that lessons for primary school children will practically not require teachers.¹⁷

This technical solution does not make good teachers obsolete, but it would mean that teachers without adequate professional skills can use online educational services in the classroom. Once children have received a basic education, they could participate in any online training course available in their own language. Ministries of education and IT companies should rapidly develop such products and make the necessary hardware available for free. If children additionally master English or another widely spoken language, they can enjoy a wide range of already available open source offers for all conceivable learning content.

For higher education, access to knowledge has become even easier. Practically all courses from all disciplines, even from top American universities such as Yale,

16 UNESCO (2014): *Education for All. Global Education Monitoring Report*. Paris: United Nations.

17 *The Guardian* (2015): Bill Gates: digital learning will revolutionise education in global south, 22 January. <http://www.theguardian.com/global-development/2015/jan/22/bill-gates-digital-learning-revolutionise-education-developing-world>

Harvard and Berkeley, are already available online. Young people in poor African countries can thus acquire knowledge that would elsewhere cost tens of thousands of dollars. Even fundamentalist religious fanatics with medieval ideas about society cannot completely block access to the global educational treasures of the 21st century. Exactly in those places where conditions for learning are deliberately made difficult, the Internet is often the only source of enlightenment.

But the use of these promising new options requires a certain level of basic education and some critical thinking ability. To use the Internet children must be able to read. To distinguish valuable from nonsensical information, they need to apply judgment. Finally, learning has a strong relationship component, especially in children. This can only be offered by a teacher, not a computer.

8. Lifelong learning

In developed countries it is slowly being recognised that education does not only place during school and job training, but that it is a lifelong necessity. The rigid life phases of education-work-retirement are dissolving. What a person has learned in their younger years nowadays rarely suffices for an entire career. Knowledge and techniques quickly become obsolete and need to be refreshed in ongoing training. This is the only way to ensure that workers remain productive for a longer period of time, which becomes more and more necessary in the face of steadily rising life expectancy. Lifelong learning is also the best basis for a healthy and active life up until old age.

This closes a circle which all modern societies experience: the education of women and their increasing employment inevitably leads to a society with a low birth rate. Education also prolongs our lives and is the main reason behind aging societies. But it is also the most important tool to alleviate the consequences of aging, as people who are better educated not only live longer, but remain, on average, physically, mentally and economically active for a longer period of time.

Even more than for industrialised nations, this instrument is important for emerging and developing countries, where life expectancy also rises, but there is so far hardly any social security in old age. In these countries people are particularly dependent on the good qualification they obtained earlier in life which, in combination with lifelong learning secures their incomes for as long as possible. Again, one thing leads to the other: people with a better initial education can more easily engage in lifelong learning.

9. Use education as social policy instrument

The points mentioned so far make clear that demographic and social developments are not a given, but controllable in many parts of the world. In political life, therefore,

different ministries share the various tasks among themselves: The Ministry of Health is responsible for health, the Department of Labour for employment policy and so on. However, there are factors that transcend all these areas of work and have a greater impact on individual development than specific interventions tailored to only one department. Education is one of the most important of these higher-level factors, because it affects the success of almost all ministries. Education should thus be used much more purposefully as an economic and social policy instrument.

This is especially true for the issue of demographic change. Here, direct interventions are often frowned upon on moral and political grounds. Prescribing how many children a person can have is politically problematic. It can hardly be put into practice in any case, which is why this approach has rarely been successful, as shown in authoritarian regimes such as China. Providing education opportunities, distributing information and offering family planning, however, is rather straightforward and would lead to protests only among the most fundamentalist circles. Through education wealth can be increased, health improved, the number of teenage pregnancies reduced – all of which are desirable developments – and incidentally population growth is controlled.

10. Hold governments of poor countries responsible

Seldom has the need of people been so great as today in the crisis areas of the world. Many people in Europe are worried about the largest wave of refugees since the end of World War II, which has initiated, despite some reservations, a wave of enormous helpfulness. But interestingly, the regions which people turn their backs on remain silent in this crisis. Neither the African Union nor the Arab League have expressed indignation over the misery of their own people. Rich oil states are not willing to grant refugees from Arab “brother states” asylum. None of the influential presidents of Africa, not even a secretary of state, has shown up in Lampedusa or Malta to mourn their drowned countrymen, as observed by Rupert Neudeck, co-founder of the charity organisation Cap Anamur, which has been active on the world’s oceans for many years. Conversely, these states did not take any measures to ensure that people do not have to flee in the first place.¹⁸

The people concerned flee from war and violence, they seek to leave poverty behind for (potential) prosperity, they look for security instead of chaos. They flee from regions where one state after another disintegrates, where governments fail. And they flee from regions where education is not appreciated or it is even opposed, to arrive in modern knowledge societies. The leaders of these countries do not seem to be aware of this development or do not want to admit to it. If they faced the facts and acted in the interests of their countries, they would have to draw the

18 *Frankfurter Allgemeine Zeitung* (2015): But Africa remains silent, 15 August.

right conclusions and take people's rights to safety, to a job and education seriously. Therefore, any help for these countries must be subject to conditions to allow change to finally take place.

11. Promote enlightenment within religions

In many Islamic countries, especially in the Arab world, religion is misused to discriminate against women, to combat and suppress dissidents, to destroy historical evidence of other religions, and to establish a supposed superiority of their culture against a "Western" education culture. In the crisis countries of West Asia, the Middle East and many parts of Africa, Islam is almost synonymous with poverty, lack of education and extreme discrimination against women.¹⁹ Seven of eleven current wars involve Islamist extremists. Countless attempts at intervention by foreign powers have repeatedly proven that terror can indeed be fought with violence, but it cannot be beaten. The solution has to come from within Islam. Muslims must be convinced that only they and their peers can reform their religion – as it was done by Christians in the darkness of the Middle Ages. They, too, were assisted by education in the renewal of that time. There is justified hope that spreading education in Muslim countries will eventually reform Islam and that the Koran undergoes a historically critical interpretation (similar to the books of other religions).

The education of broad social layers has accompanied the major Muslim countries Malaysia and Indonesia on their path of peaceful development. In the Middle East, Iran with its high level of education could be the next candidate for a pacifying secularisation. But the West can contribute to a modernisation of Islam: it must practise religious tolerance towards its own immigrants, learn about Islam and strengthen secular forces. Peaceful coexistence with immigrants and the social rise of migrants through education must become exemplary. News about this must spread beyond national borders to the migrants' countries of origin.

Fundamentalists are not active only in Islam. Education and anti-scientific tendencies and opponents of Enlightenment have prevailed in all major religions, from Christianity to Judaism to Hinduism. If fundamentalists absolutise their messages and counter dissenters with violence instead of arguments, then they are a danger to peace, just like Al Qaeda or Boko Haram. Education alone cannot eradicate this danger, since the spiritual leaders of these groups are often well educated. But they can be pushed back when the people who are tyrannised by them are themselves as well educated as possible and can oppose fundamentalist ideologies with a critical awareness.

19 Die Welt (2015): The Arabic World Will Be a Disaster. Interview mit Thomas L. Friedman, 1 May.

12. Accept a culture of scientific education as the basis for government action

The pending social, economic and environmental challenges at the beginning of the 21st century cannot be solved by ideologues or fundamentalists. Neither Christian creationists who exert significant influence on US politics, nor Islamists who abuse their religion to maintain power in primitive ways, nor Hindu extremists who try to turn back time on the Indian subcontinent have any solution for, or expertise in dealing with, the acute problems facing humanity. These problems are partly new in nature and they are exacerbated in the context of globalisation.

Politicians must be ready more than ever to ask for assistance from specialised experts from “intervention studies”: climate experts, demographers, agronomists, or conflict researchers. Politicians must learn to understand how systems and societies function, what the consequences of certain interventions are and to what inaction leads. For this purpose Great Britain established the “Government Office for Science”, which is meant to consult with the government on the best scientific arguments and make decisions on the basis of long-term strategic thinking.²⁰ At the end of the day decisions must of course still be taken by politicians, because scientists are usually not trained for political actions. Ideally, these decisions will be supported by popular verdict.

These twelve points to end global educational poverty are not exhaustive. They are based on the analyses presented in this book and summarise the resulting priorities for action. They are intended to confirm the urgent need for a new education revolution, because in many places significant negative developments, from climate change to the spread of terror to global refugee flows, have gained momentum and cannot be stopped overnight. If we do not commit ourselves to bringing about an education revolution quickly, it will become increasingly difficult to find solutions.

Who will survive? The course is being set now

This book is about the importance of education for the survival of people, indeed the whole of humanity. Knowledge and the ability to use this knowledge have always had an impact on the welfare, success and ultimately the viability of each individual and their families. Today, in every country in the world newborn children have a significantly higher probability of surviving the critical first year of life if their mothers have at least obtained a basic education. Every person’s life expectancy is also highly dependent on his/her education. Depending on the society and lifestyle,

20 Government UK/Government Office for Science (2015): The next 5 years. <https://www.gov.uk/government/organisations/government-office-for-science>

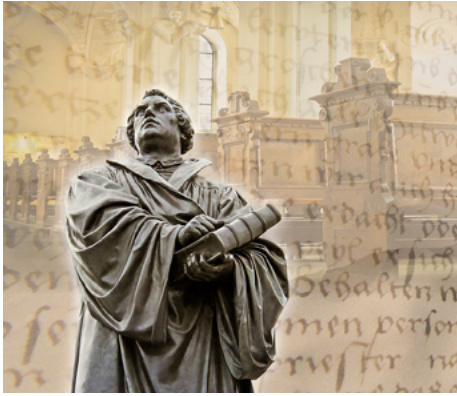
the most educated groups have a four to twelve years longer life expectancy than those with the lowest level of education.

Not only individuals but entire countries and societies have expectations of their future. Whether they prosper, whether they evolve or perish, whether they can provide their citizens with a safe and good life, or whether they lead dissatisfied and frustrated people to oppose those in power, all of these issues are directly dependent on the population's level of education. Only countries with sufficiently skilled people are able to meet the demands of the 21st century in terms of public health, administration, security, infrastructure and the economy. Only those countries can enable people to achieve personal development, wellbeing and a healthy life, thus creating conditions for peaceful coexistence. On top of this, better educated nations have a much stronger position when it comes to competing on the world market and influencing the design of the international order.

At the global level all people are in the same boat. No country can isolate itself today and escape important developments that take place in the rest of the world. This applies particularly to climate change, which knows no national boundaries. But it also applies to the globalised economy, to major conflicts and their consequences, including international migration. Whether the people of Pakistan or Nigeria can benefit from the global education revolution in the future, therefore, is also in the interest of countries such as Germany or the USA, which are thousands of kilometres away from these trouble spots.

The battle of education cultures is therefore a struggle for the future of humanity – and that is not so obvious to many people. It lies beyond daily politics and our daily news, whose contents merely deal with the immediate effects of this struggle: hunger and poverty in the world, rampant terror, flaring conflicts, civil wars and increasing refugee waves.

The battle of education cultures aggravates the developmental gap between the better and the less qualified part of the world population, not least because the lack of female education results in more children. Their opportunities are decreasing, while cultures valuing education benefit from scientific knowledge and can further improve. This widening divide is probably the biggest challenge to the future of the world community. Ignorance is the worst enemy of humanity.



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