

WDA Forum



University of St.Gallen

Project Papers 2018

on Demographic Challenges

Megatrend “Global Demographic Change” Tackling Business and Society Challenges in 2030 and Beyond

*Master Class Seminar by Dr. med. Hans Groth, MBA
at the University of St. Gallen, Switzerland
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I. INTRODUCTION

Since 2009 I have had the privilege to teach a master class at the University of St. Gallen entitled “Megatrend Global Demographic Change: Tackling Business and Society Challenges in 2030 and beyond”.

The concept of this class is based on case studies, discussion rounds and interactive outside-the-box conversations on global population dynamics in the 21st century and their impact on business, society and governance. The case studies elaborated each year by the students focus upon four theme categories:

- Country & regional case studies all across the globe
- Opportunities arising from demography for business & society
- Geopolitics & financial markets
- The unique population dynamics of Switzerland

The specific focus of the 2018 topics is for very good reasons:

- On Africa – because it this continent where unprecedented population growth with unsolved implications will occur in the 21st century. But how can the continent create a promising future for their citizens?
- On Longevity – because life expectancy will continue to increase all across the globe in the 21st century. We need to understand what drives longevity and what are the strategies in business & society to make it an achievement.
- On Digitalization – because it will change the way who we will live a longer life. But are we prepared and willing to capture arising opportunities?
- On Migration in Europe – because its dynamics will the shape of the future societal and economic future and competitiveness of this continent.
- On Retirement in Switzerland – because this topic is far from being put on a sustainable track, particularly in light of a shrinking and ageing population (if migration is excluded).

But what is my motivation to offer such a seminar with both a changing content each year and a very interactive style?

The coming decades will expose us to demographic dynamics that history has not equipped us to manage/to cope with. It forces us to focus on the future, a period of time which we are not accustomed to reflecting upon. This is why the megatrend “Demographic Change” is so intimidating and makes it all the more crucial to be permanently prepared for innovation and creativity as well as openness for change.

However, this will only be achievable if appropriate education/training and thus knowledge/skills are provided for those who have to lead and manage this upcoming challenge.

My responsibility as a member of the 60+ generation is to provide my professional experience as a “retired manager”. To make this happen I have offered in the past 10 years a platform for academic thinking and exchange for HSG students who want to broaden their scope about demography and its impact on business, governance and society – both as managers and as responsible members in the communities they are living in.

In this year’s autumn semester 20 students from 8 different nations (Belgium, France, Germany, Austria, China, Sweden, India and Switzerland) and from 8 different HSG Programs (SIM, MBF, MaccFin, MSC, MBI, MUG, CEMS, Master Exchange) successfully bid for my class.

In this book, you will find the corresponding papers which were elaborated by these 20 engaged students in October - November 2018. Prior to submission all papers have been presented and vividly discussed in class.

I am convinced that the 2018 papers will be an extremely inspiring source on how our “Planet Earth” might develop. One might also agree that these students started to develop a solid understanding about their business and civil society environment in which they are most likely to live in between 2030 and 2050.

On behalf of all 20 students who contributed to the content of this booklet, I am happy to facilitate further discussions with any potential reader.

Dr. med. Hans Groth, MBA

Chairman of the World Demographic & Ageing Forum (WDA Forum)

Guest Lecturer on “Demography and its interdependencies to wealth, health and social sustainability”, University of St. Gallen

St. Gallen, February 2019

II. PAPERS OF THE 2018 MASTER CLASS

Contents

Country & regional case studies all across the globe

- A. Africa's Population: How could the continent capture its opportunities?

Opportunities arising from demography for business & society

- B. Longevity of humankind: What is its history, what are the scenarios and consequences for the 21st century? Are there countries/regions to learn from?
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- D. Migration in and into Europe: Societal, political and economic impact in the past and in the future till 2030
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The unique population dynamics of Switzerland

- G. Pension systems: Discuss the Swiss AHV/IV and BVG systems in light of changing demography and provide three alternative systems. Discuss your options also within the context of the currently proposed solution by the Swiss Federal Council.



Country & regional case studies

A. Africa's Population: How can the continent capture its opportunities

- 1. Innovation in Africa: Education and Fintech Perspective**
Submitted by Yash Gadiya
- 2. Unlocking Africa's Potential – A Case for Entrepreneurship**
Submitted by Matthias Paulus
- 3. Africa's population: How can the continent capture its opportunities?**
Submitted by Luka Sporcic

Africa's Population: How can the continent capture its opportunities

Innovation in Africa: Education and Fintech Perspective

Submitted by Yash Gadiya

Introduction

According to a UN report, more than half of the global population growth until 2050 is expected to occur in Africa. There will be 1.3 billion more people in Africa by 2050. Out of this total population, 1.5 billion would be among the age range of 15-64. In other words, Sub Saharan Africa will have 50-60% of its population below the age of 25. While this provides an exciting growth opportunity, the challenge is that Sub Saharan Africa must produce 18 million high skilled jobs per year until 2035. Though there are numerous ways to realize the potential of these activities, innovation plays a key role in ensuring that the maximum possible benefit is realized.

It is rightly said that change is the end result of all true learning. For there to be a shift in towards rapid economic growth in Africa, there needs to be a strong base that is used to create a successful emerging workforce in Africa. The purpose of education is to instill in strong skills and values to develop the minds that spearhead the growth of a nation. It is critical that this process is nurtured and handled in an effective manner and priority is given to ensure a qualitative and well-balanced development of the youth.

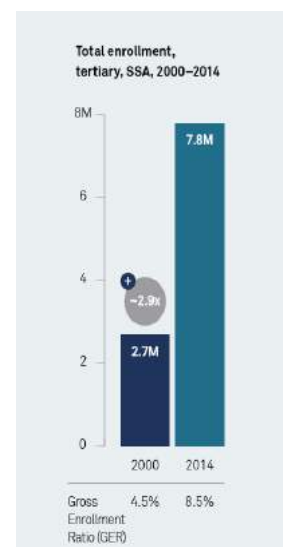
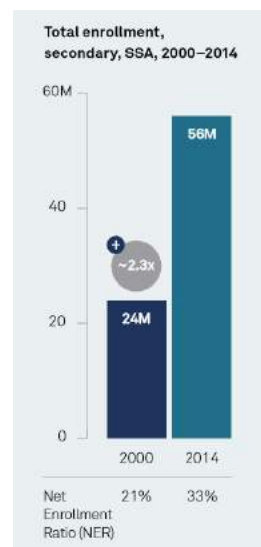
In addition to education, there is a need to provide for a faster means of exchange of funds to keep up with the volume of cross-border and increasingly frequent financial transactions in today's evolving world. This access would lead to an increase in the ease of doing business and would facilitate access to funds across a wider spectrum of people.

Digitization could arguably be called the most important driver of growth in the 21st century. Applying digitization to the above to fields can lead to interesting and advantageous results as explained below.

Innovation in Education

Education has been a key issue hindering Africa's growth in the past decades. At least 50 million children in Africa are currently out of school, out of which 15 million have not been to school. Enrollment Ratios are still not close to the global averages with net secondary enroll-

ment still at 33% and gross tertiary enrollment at 8.5%. The issue isn't just about enrollments, but it is also about the access to education and the quality of education provided. Many students are marginalized from education due to rurality, gender, special needs status, socioeconomic status, and other factors. For example, on current trends, the poorest girls in Sub Saharan Africa will achieve universal primary completion 20 years after the poorest boys. Regarding quality, it is said that 7 out of 10 countries are facing an acute shortage of teachers. Sub Saharan Africa is also the worst-performing region globally for educational quality and learning outcomes, with up to 40% of children not meeting basic learning outcomes in literacy and numeracy. Another issue that hinders the progress towards education for children is poverty. Adult families living in poverty have expectations of their children becoming bread winners for the family at a very young age. They are forced to put their children into labour for basic survival and cannot them to pursue education beyond a basic level.

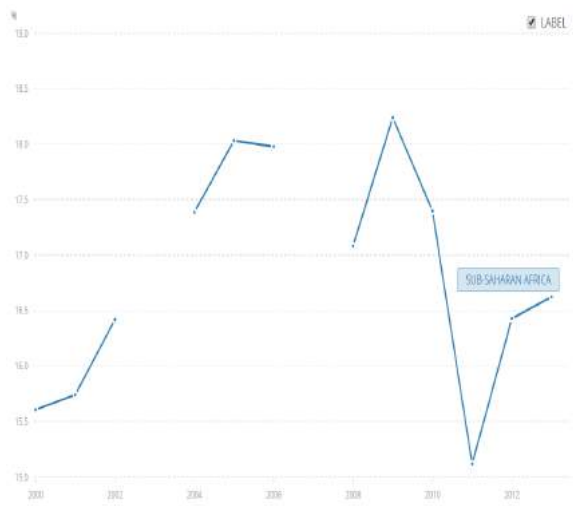


There have been certain successful reforms in the African education space that have increased literacy across the country. These include:

- Increase in the education budget

Certain African governments have been quick to realize that education plays an important role in the country's growth. Investment in education

has averaged between 15-20% in the recent years.



Sub-Saharan government expenditure on Education as a part of total expenditure

- Volunteering Programs

Programs like Peace Corps have continued to successfully implement and teach the basics of the English language across underdeveloped communities of Africa. As a matter of fact at certain times there were more Peace Corp volunteer teachers than local English language teachers in certain African countries.

- Teacher Management

Initially, the governments had constantly focused on making the teaching profession stand out as a lucrative career option by offering high salaries. However, this was not sustainable in the long run and the average salary of a primary school teacher dropped from 8.4 times GDP per capita in 1975 to 4.0 times GDP per capita during the period 2003-2009.

Hence there is a need to develop additional solutions that can be sustained in the long run.

While the above solutions have been effective there are new innovative solutions that could accelerate this process and solve the problems in a further effective manner. These solutions include:

- Digitization

The use of the internet and communication devices play a key role in improving the quality of education. With the help of virtual classes, educational content can be standardized irrespective of the schools being in rural or urban areas. It also solves the problems of educational reach in areas where

teacher population is not very high. For example, in certain parts of Malawi the Pupil-Teacher Ratio (PTR) is 131 pupils per teacher. The use of virtual classrooms can be used to solve these problems. Pupils can get access to quality rich content from world class professors delivered directly to them.

- Distant Learning

Geographical barriers to education pose a large problem for people in areas such as Africa with a poor infrastructural and transport system. Distant learning programs especially in the tertiary sector essentially eliminate such issues. One such program, The Varkey Foundation operates a distance learning initiative – “Making Ghanaian Girls Great” – tailored for girls, who are prone to leaving school prematurely. Lessons are led by a teacher based in a studio in the capital, Accra, that are then fed into classrooms throughout the region. A local teacher is present in each classroom to ensure that pupils keep up with the lessons.

- Food Incentive Programs

Akshaya Patra is the world’s largest (not-for-profit run) Mid-Day Meal Programme serving wholesome food every school day to over 1.7 million children from 14,314 schools across 12 states in India. The institution solves three concrete problems with one simple yet effective solution. By serving lunch at government run schools for the underdeveloped sections of the society it focuses on the nutrition and reduces the problem of hunger. Since the meals are free, families are further encouraged to send their children to attend school and thereby reduces the possibility of child labour.

- Vocational Training

As per studies, 54% of African employers state that job seekers’ skills do not match their needs. Technical & Vocational education programs have not been a part of the continent’s priorities, in 2012, technical and vocational programs accounted for only 6% of total secondary enrollment. A strategic solution could be developed by looking at the model of Germany where in close to 65% of the students pursue vocational studies and are able to successfully supply the demands of the employer market.

Innovation with Financial Payments

Some African countries were quick to embrace technology as a method to make safe, secure payments.

Zimbabwe, one of the most literate countries in Africa, embraced digitization of money fiercely. By 2017, 96% of over 1 billion transactions were processed electronically, with a deal value of USD 97.5 billion. The value of mobile financial services transactions in 2017 stood at USD 18 billion, an increase of 210% from the USD 5.8 billion recorded in 2016. The number of subscribers of mobile payment platforms increased by 41% to 4.6 million while internet banking subscribers increased by 65% compared to 2016. In value terms, RTGS was the largest contributor at 63% with approximately USD 62 billion. Even the volumes went up by 103% compared to the previous year. Debit cards were up by 37%, prepaid cards up by 48% and credit cards by 9%. On a comparison basis aggregate electronic means of payments in terms of values and volumes grew significantly by 41% and 164%, respectively, in 2017. Only ATMs recorded a decline of 1%.

Although embracing digital forms of payment spells advancement, this era of cashless society stems from the crisis the nation has been facing since the past decade. A series of political and economic crisis due to political instability and incompetent governance has led to hyperinflation. With rising unemployment due to collapse in agricultural, banking and manufacturing sectors, the government was faced with economic crisis. Instead of spending cuts and new economic policies, the authorities began to print money to aid economic growth. This destroyed faith in the currency, triggering hyperinflation and eventually devaluation of the local currency. To counter the crisis, the government imposed a switch to the most stable currency in the world- US Dollars. Because of extremely high currency exchange rates, the people were left with no money. Dollarization also meant that the government could not print more money to circulate in the economy. With not enough dollars circulating in Zimbabwe (around USD 300 million), it became a common sight to see fearful citizens queuing outside banks and ATMs, waiting hopefully to withdraw USD 40, the upper limit for single withdrawal. Quite often, despite queuing up for hours, people returned home disappointed, without any dollars in hand.

This situation led to the positive turn in terms of people embracing digitization of payments. Mobile money platforms became exponentially

popular. In regions with a high proportion of unbanked citizens, such as Sub-Saharan Africa, mobile money accounts provide a viable alternative to traditional banking and promotes financial inclusion. Mobile money allows users to make and receive cross border transfers, to make electronic payments and to safely deposit their money. Many mobile money service providers have begun to offer additional services, such as small loans. The data created via mobile money accounts can serve as a basis for credit scores, further improving the economic alternatives available to mobile money account holders. Mobile money payments have numerous benefits including convenience, increased security and inexpensive transaction fee.

Currently, the most dominant mobile payment app is EcoCash with a share of 95.1% of the mobile money market, followed by Telecash and OneMoney. EcoCash has enabled toll payments, bank to wallet transactions, bill payments and MasterCard debit card payments on its mobile money platform, enabling easier living solutions for the citizens of Zimbabwe in face of the currency crisis.

Due to the popularity and high penetration rates of mobile money and payments, leading banks in Africa have begun collaborating with leading telco's and Payment Service Providers (PSPs) who offer mobile money solutions. As banks increase their interoperability and partner with mobile payment providers, the penetration of this highly secure and convenient payment alternative is poised to continue to grow the world of digital payments in Zimbabwe and consequently Africa, leading to advancement in the populous continent.

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Unlocking Africa's Potential – A Case for Entrepreneurship

Submitted by Matthias Paulus

Introduction

Demographic change is a global issue that is split between growing and ageing populations. Both issues affect our basic needs, access to water, food, health or energy, as well as our society differently. For more developed countries, demographic changes are representing their key future challenge. The aging population and with it the shrinking working class will have major influences on the economic, societal and ecological development of a country. According to various studies the world's population will increase to 9.8 billion by 2050. This growth is primarily happening in less developed countries with already weak political, social and economic institutions. This increases the already numerous existing challenges of those countries. Consequences of rapid population growth are immediate needs for more food, clothing, education or employment opportunities. These are enormous challenges that the less developed countries are facing and will be facing in the future.

When addressing less developing countries, Africa is representing a continent which has by definition the most developing countries. Further, when having a closer look at its population dynamics by the UN Population Division, one can observe a massive population growth forecast. Countries as Nigeria, Congo, Ethiopia or Egypt could become one of the biggest countries of the world population wise and thus be replacing the current leaders. Besides those countries, an enormous population growth is predicted for all of Africa. While back in year 2000 Africa accounted for only 13 percent of the population, this number grew to 16% in 2016 and will continue to grow quickly.

Africa's growth is mainly due to the following three reasons: low mortality rate, high birth rate and cultural factors. Due to a better hygiene the mortality rate, especially for children decreased substantially. Meaning that infants born are much more likely to survive. Still, the birth rate has not yet adjusted. Additionally, modern contraceptives are not yet wide spread. These factors lead to a above replacement rate birth rate throughout the continent, sometimes reaching as high as 6.62 children per women, as in Nigeria. This in terms creates a very young society with a median age of only 19.4 years (Worldometer, 2018). Last, but not least, there

is a deeply rooted culture that is an additional reason behind the rapid population growth. In many countries of Africa, large families are still seen as politically, culturally and economically advantageous. Only few governments of African countries realize that a rapid population growth can hinder the development of a country. Rapid growth often implies large scale consequences, as the problem is multiplied by the factor population. Problems includes increasing poverty, health care issues and lack of education. This mostly results in a higher dependence on international aid and the inability to tackle issues out of their own capacity. In this sense it is not surprising that overall it can be said that a rather weak political and social will to address the topic of family planning in a systematic, namely governmental, way exists. Even though national birth control initiatives and agencies exist, they are usually lacking important resources. In addition, the leader of those initiatives or agencies have themselves have low motivation and enthusiasm to address the issue at hand and change the status quo.

Due to those reasons presented above, the rapid population growth in Africa will continue. Having talked about the risks, this high growth rate also bears enormous potential and opportunities. It leads to a growing working population. A growing working population can be a factor of economic growth. To capture this growing working class and transform it into economic growth, three initiatives are discussed briefly in the following chapter, before focusing on entrepreneurship and its potential. All initiatives are targeted at improving the living conditions through economic growth. Following the logic, that economic growth will benefit the general population and lift people out of poverty. As it has been the case with China and India.

Infrastructure

Many attributes the United States economic success to become to the world's biggest economy to their infrastructure. Due to a recession with widespread poverty, the US government initiated the biggest infrastructure construction project in the country's history in the 1930's. Analog to this model, the authors believe, that through improved infrastructure, Africa could participate better in trade, thus according to economic theory, generate economic growth, due to specialization potential and increased

productivity derived from that. Better infrastructure would ultimately also mean better access to markets to sell goods.

Education

Huge population also means huge markets. This attracts international companies who want to draw their workforce from a pool of well-educated people. Giving access to education will also unlock Africa's innovation potential. Even though Africa is one of the most populous continent, it lacks behind in scientific papers written, research conducted and innovations patented to the rest of the world. Educating the broad population could change that.

Entrepreneurship

Entrepreneurship has the possibility to unlock Africa's potential in a uniquely inclusive way. As Mohammed Yunus once said, money attracts money, once you have a certain amount of money, it's easier to attract more. Governments and private people therefore should focus on creating these pools of wealth. Entrepreneurship can be the basis of such a pool. Additionally, entrepreneurship is one of the biggest sources for job growth and economic development. Besides that, entrepreneurship taps into the collective intelligence and problem-solving skills, increasing the likelihood for good solutions and increasing the standard of living, as real needs are addressed (Yunus & Weber, 2017). Talking about entrepreneurship it's not about starting multi-billion companies. Self-employment is the biggest and most important form of entrepreneurship.

Three pillars are important for entrepreneurship to flourish. Access to 1st skills, 2nd a network and 3rd to financial resources. How can these hurdles be reduced?

In order to improve skills (1st), it is important to improve relevant skills. Hard skills are primarily a source of income in a developing country. Apprenticeship programs could cover the current gap and help people develop job relevant skills, such as plumbing, cooking, cleaning, bricklaying and other directly applicable skills. These skills directly offer the opportunity to be self-employed. Furthermore, in community classes and workshops online or offline the most important skills can be taught. This should include basic business skills, such as book keeping, respectively finance, marketing and selling. These would greatly increase the success rate of the ventures.

To improve the network of entrepreneurs (2nd) it is important to either facilitate contacts or get

people together for networking reasons. Conferences and associations can be a great opportunity to enable networking for entrepreneurs. A professional networker employed by the government with the sole role of facilitating contacts and bringing people together can be another approach to achieve the right networking factor for entrepreneurs to be successful. Network plays a crucial role in scaling a working business or needing help in achieving a more ambitious idea, which goes beyond self-employment and will change or at least challenge an industry, or simply to spread a working idea.

Initiating a self-employment venture can only be done through access to financial resources (3rd). Studies have shown, that microcredits have led to an increase in micro-ventures and self-employment ventures. In order to increase access to financial resources, especially microcredits, two factors are crucial. Either to cut costs or target the audience better to evade losses. Cutting costs refers to reducing interest payments, as well as making more money available for microcredits through reducing overhead costs. Targeting the audience better refers to evading losses through having more trustworthy and promising loan receivers. This can be done by putting a referral and control system in place. Grameen Bank has successfully scaled a business model, where loans are controlled by other loan receivers, this community building around loans has fostered an incredible repayment rate of over 97%. Having access to financial capital is a precondition for starting any venture.

All these activities would greatly increase the entrepreneurship opportunities of a country. As will be shown below, Kenya has managed to do exactly that. But first, let's look at another precondition for an economy benefitting all, and not just a few.

The theory of why nations fail encompasses that both institutions, referencing political institutions, as well as economies can be designed to be inclusive or extractive. Inclusive in institutions and economies means, that the public can actively participate in it. Extractive means that the public has no access to influence the current state and is excluded from participating. In terms of political institutions inclusive would mean, that people can vote, check and constrain politicians through pre-defined, often democratic processes, such as general elections. In terms of economies inclusive means that a legal framework exists, that levels the playing field. This legal framework should se-

cure property rights and have laws in place to protect the common good. Additionally, inclusive political institutions should facilitate access to education and knowledge. Extractive refers to the opposite. Political institutions would be designed, that power lies in the hand of a few. The general public does not participate in the political process, nor holds any political power. For economies this would mean, that the public only participates as a working force. Through a defect legal system, the law of the stronger would prevail, without a legal framework in place to protect property nor level the playing fields for the general population (Robinson & Acemoglu, 2012).

Kenya is the most innovative country in Africa, that managed to create an inclusive economy and fostering entrepreneurship. The pillars upon which this system is based are access to mobile money and banking (M-Pesa). This mobile money greatly increased access to money, payment and simplified trade. Reducing the hurdles for access to capital. A precondition for that was access to the internet. Through different projects, Kenya scaled its phone use and with it access to the internet, within a decade the phone using population jumped from just under 20% to over 90% of the population. Additionally, Kenya launched a crowdsourcing app called Ushahidi. This app allowed not only to better network and offer one's skills on a platform basis, but also opened the opportunity for every phone user to participate in the economy. In combination with the mobile money, this proved to be a huge source of growth. An estimated 25% of the GDP pass, or are generated through the Ushahidi app today (WEF, 2015). Finally, access to education has been greatly improved throughout these years. All these initiatives have helped Kenya to increase its GDP to 74.9 Billion USD in 2018. In 2002 the GDP of Kenya accounted to solely 13.1 billion USD. Today 61.4% of people are self-employed and the unemployment rate is at 11.3% in 2018 which is below the African average of 12.5%. Youth employment stands at 26.2% also 4% lower than the African average of 30% (World Bank, 2018). Although these numbers may not look as promising, it is to note, that since 2014, employment options through startups has started to increase. About 3% of the annual job growth stemmed from startups in 2014. And only in 2014 have public schools started to include entrepreneurship and self-employment relevant courses to the mandatory education. Today, self-employment is a viable option for the Kenyan youth. Additionally, Kenya has been ranked the most innovative country in Africa for

the past years.

Concluding I am convinced, that self-employment or entrepreneurship can not only solve the issues of Africa but unlock its collective potential. With the right initiatives in place, this can bring the continent up to speed, as Kenya shows, through well intended, thought through and aligned initiatives fostering entrepreneurship. All initiatives need to target improving skills, improving networking opportunities and improving access to financial capital. A working system of entrepreneurship does build upon the pillar of education and infrastructure, both seen above as alternative initiatives. Each one of those initiatives can have a beneficial impact to unlock Africa's potential. Depending on the country one or the other approach might be more effective.

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Africa's population: How can the continent capture its opportunities?

Submitted by Luka Sporic

Introduction

Demographic change is not a regional phenomenon only affecting a certain region of the globe. It is more of a global issue that reaches beyond a growing and ageing population affecting basic needs as the access to water, food, health or energy. For developed countries, demographic shifts represent one of their key future challenges, involving a complex structure that will have major influences on the economic, societal and ecological development of countries. In order to not be overwhelmed by the massive impact of the demographic change, the world therefore needs to be prepared for change and start thinking in a long-term perspective. According to various studies, the world's population will increase to 9.8 billion by 2050. If this massive growth, that has never been the case in the history of humans, would spread equally, we would have less to worry about. Yet, this growth is primarily taking place in less developed countries with already weak political, social and economical institutions which consequently increases the scale of the effect. Implications of rapid population growth like the immediate need for food, clothing, education or employment are becoming enormous challenges that less developed countries are facing. On the other hand, developed countries are also being affected by demographic change. An increasing living standard combined with below replacement birth rates are driving the countries into an unpleasant situation with a growing number of retired people and a shrinking workforce. Yet, this impact will not be further discussed in this management summary due to a limited amount of characters.

When addressing less developed countries, Africa represents a continent with many countries that have weak political, social and economic institutions. Further, when having a closer look on the population dynamics by the UN Population Division one can observe a massive population growth forecast there. Countries such as Nigeria, Congo, Ethiopia or Egypt could become the next biggest countries in terms of population and might replace the current countries as Russia or Mexico for instance. Also when observing the numbers (see Table 1), one can detect the massive growth predicted in Africa. While Africa accounted for only 13 % of the population in 2000, this number grew to 16% in 2016 and will continue to grow in high speed.

Africa's growth is mainly due to the following three reasons: low mortality rate, high birth rate

	1500	1700	1913	2000
Welt	438	603	1 791	6 062
Afrika	47	61	125	798
Afrika in %	11%	10%	7%	13%
	2016	2030	2050	2100
Welt	7 418	8 505	9 804	11 213
Afrika	1 203	1 658	2 473	4 387
Afrika in %	16%	19%	25%	39%

Table 1: Africa's population growth. Groth, 2018.

and momentum. Due to better hygiene standards the mortality rate, especially for children decreased substantially. When examining the birth rate one can notice that modern contraceptives are only slowly being adopted. Thus, the birth rate keeps being high. Similarly, the momentum adds towards the increase in population due to a very young age distribution. However, there are far more reasons behind the rapid population growth which are deeply rooted in the cultures of the various countries. For instance, large families are still seen as politically, culturally and economically advantageous. Thus, most African women do not deter from giving birth to multiple children. Some sources claim that having an extra child in certain African countries entails no extra cost as children are usually getting raised by other adults (aunts, grandparents etc.) who then also cover the costs for food and clothing. In this regard, there is little incentive for parents to limit their family size. On the other hand, only few governments of African countries realize that a rapid population growth can hinder the development of a country. Mostly because they themselves are part of old cultural norms and traditions and therefore are missing a broader perspective that would be required from country leaders. In this sense it is not surprising that one can determine a rather weak political and social will to address the topic of family planning in a systematic way. National birth controls exist; however, they are lacking important resources and additionally, are lead by people with low motivation and enthusiasm. Moreover, such a rapid population growth often implies some larger scale consequences. Problems include increasing poverty, health care issues, lack of education that mostly result in a higher dependence on international aid.

However, the rapid population growth in Africa also bears enormous potential and opportunities. One positive development is that the continent has an increasing work population. Something that many other developed countries are dreaming of. Thus, after discussing the scale of the demographic change, Africa's population growth and the reasons behind it, the next part will deliberate three initiatives about how the continent can capture its opportunities.

3 Initiatives

Entrepreneurship

One way of how the continent could capture its opportunities is through a strong focus on entrepreneurship. It is important to clarify that the term "entrepreneur" doesn't necessarily mean to be a unicorn leader, but more of a self-employed person that uses its creativity to solve problems. The biggest advantages include creation of jobs, raising the standard of living that eventually creates economic growth. Yet, the question of what are the exact ways to unlock the above-mentioned advantages is often raised. According to Kane one way is to create a beneficial environment for start ups, as they are the companies that are responsible for the biggest source of jobs. Further, Yunus and Weber claim that another approach would be to focus on social businesses. In their argumentation it is the access to an entrepreneurial environment that enables creative thinkers to join forces and solve complex problems. They also like to call it the creation of little pools of wealth that are the main drivers for future growth. Moreover, the OECD identified three main enablers of entrepreneurship, being: access to financial resources, skills and network. An easier access to financial resources leads to more microcredits which directly lead to an increase in micro- or self-employed ventures. This access to financial resource is based on two main pillars. First, one needs to lower the costs of microcredits through either more subsidies (e.g. by government) or decreasing operating expenses. Second, one needs to boost innovation and increase the impact of microcredits through better targeting potential individuals or offering more customized products to customers. Only when having access to financial resources a potential startup can evolve.

Another key enabler for entrepreneurship are skills. Once the access to financial resources is given, one needs to develop skills in order to foster the self-employed structure. Thus, in a developing country hard-skills and knowledge are essentials which need to be acquired first.

Once the basic is set, it is the right moment to start attending workshops or seminars on market developments to expand one's horizon. If business skills (marketing, soft skills) are then added, one has everything to become a successful entrepreneur and would have a direct impact on the increasing number of start-ups.

However, no entrepreneur can become successful alone. Thus, the last missing step is network. Accordingly, Semrau and Werner identified two main activities that could foster the network. First, it is the government's job to provide meeting spaces and organize conferences to foster the community. Second, the entrepreneurs will also need to actively attend conferences and thereby increase their personal network.

Hence, a focus on entrepreneurship is one of the options how Africa could capture its potential.

Education

A second way of how to capture Africa's potential is through the emphasis on education. Currently, there are four forces shaping education in Africa: huge demographic shifts, emergence of a middle class, rapid urbanization and the use of technology. As already discussed earlier, the African continent is the youngest region in the world with 50-60% of the population being below 25 years implying an immense demand for new jobs. Further, as the GDP in African countries is growing, 11% of the population is expected to move from low to middle class earnings. With this shift there is an ever-increasing amount of people moving towards cities making Africa experiencing a rapid urbanization which also increases the use of technology. Yet, there are multiple problems which the education sector in Africa is facing.

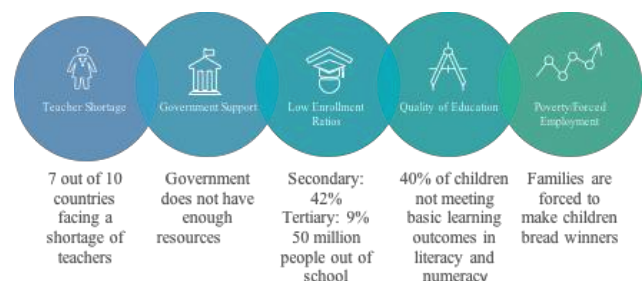


Figure 1: Problems in the education sector. World Bank, 2018.

Teacher shortage, intensified through the lack of government support, is a first cluster of problems. Further, this has a direct impact on the quality of education leading to the result that

40% of children are not meeting the basic learnings of numeracy and literacy. Also, there are multiple families that force their children to work due to the high poverty making it impossible for children to go to school. Consequently, to solve the education problem there are multiple classical solutions as increasing the education budget, volunteering programs from more developed countries or better teacher workshops to increase their teaching quality. However, this paper suggests to apply more modern solutions as incentives through food schemes or digitation. A forefront example is the Akshaya Patra NGO that runs school programs and provides children with Midday meals decreasing the burden for parents to send their children to school. Another initiative is the “One Laptop per Child Foundation” that has the goal to transform education based on the distribution of educational devices.

Therefore, in order to capture Africa’s full potential, education is building another key pillar.

Infrastructure

A last way of how to use the potential of Africa is through a well-built infrastructure. Many researchers confirm that a well-developed infrastructure fosters economic growth, provides better connectivity and therefore enhances productivity and efficiency.

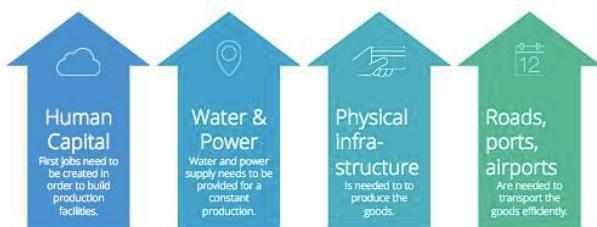


Figure 2: Infrastructure - key pillars. Own Graph. MSG, 2018.

The initiative has its roots in the Great Depression in the US in 1929. As a response to the stagnating economy, high unemployment and spreading poverty, president Roosevelt enacted a program to start building large scale public work projects. The most famous examples resulting from these projects include the La Guardia Airport (NY), the Lincoln tunnel or the Hoover dam. It is interesting to observe that the aforementioned projects were not chosen randomly but can be connected to the pillars above (see Figure 2). Through the massive employment of formerly unemployed American citizens, Roosevelt created jobs and indirectly human capital. One example is the Hoover dam spanning over the Canyon of the Colorado River that is providing significant amount of power to the States of Arizona, Nevada and Southern Califor-

nia. According to various sources, more than 20,000 workers were working back then to build one of the world’s largest architectures. Thus, Roosevelt knew how to create jobs and more importantly where to utilize the workers. When looking at the Lincoln Tunnel or the La Guardia Airport, it is obvious to which pillar they belong. Next to all the manufactories, it is equally important for a country to have good roads, ports and airports that enable it to transport the goods to the required destinations but also to be able to acquire the raw materials needed in the production process. The Lincoln Tunnel under the Hudson River connecting Manhattan and New Jersey is being used by more than 112,000 vehicles per day. Hence, its crucial importance to enable the movement of goods and human capital is indispensable. Many researches have been discussing the importance of infrastructure and concluded that no nation can develop without investing into infrastructure. The human history provides us with multiple examples (aftermath of WW 2 and large infrastructure projects in Japan or South Korea) upon which less developed countries should orientate themselves. Africa is truly doing that by having multiple ongoing and planned infrastructure projects in their building portfolio. One famous example is the Grand Ethiopian Renaissance Dam on the Blue Nil River that will be the largest hydroelectric power plant in Africa (and 7th in the world) once it is completed. The construction started back in 2011 and has an estimated cost of 4bn USD that is mainly financed by the Ethiopian government. It will grant the electric independence to a country whose energy demand grows by 30% each year and fosters one of the four key pillars of a well developed country infrastructure. Another important infrastructure project is being built in Tanzania; the new Bagamoyo port. Back in the years, it was the main capital of German East Africa and heavily used as a holding center before slaves were transported to Zanzibar. Yet, currently, Bagamoyo port is aiming to become the largest port in East and Central Africa with an estimated handling volume of 20 million containers per year. Moreover, the tri government projects are financed by China Merchants Holdings International, Oman’s State Government Reserve Fund and Tanzania and thereby covering another important pillar of a well-developed country infrastructure.

Conclusion

Africa’s demographic change connected with the massive population growth seemed problematic in the first place due to various social,

economic and ecological problems that could follow. Yet, behind the population growth there is also enormous potential hidden. With the three initiatives of entrepreneurship, education and infrastructure, this paper wanted to provide a basis for solving the question of how to capture Africa's potential for the greater good of the society. Thereby, making an important step towards a proactive solution as in case of a no action Africa's population growth could impact all of us in a negative way.

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Opportunities arising from demography for business & society

B. Longevity of humankind: What is its history, what are the scenarios and consequences for the 21st century? Are there countries/regions to learn from?

1. Major factors which could drive a decrease in Life Expectancy

Submitted by Lakshman Teja Lattipally

2. The Individual and Global Economic Consequences of the Longevity Revolution

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C. Demography and Digitalization: How can Blockchain and digital assets help to make longevity an opportunity?

1. An analysis with emphasis on existing blockchain solutions in healthcare

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Longevity of humankind: What is its history, what are the scenarios and consequences for the 21st century? Are there countries/regions to learn from?

Major factors which could drive a decrease in Life Expectancy

Submitted by Lakshman Teja Lattipally

Introduction

Between 2000 and 2016, the world has seen the fastest increase in life expectancy since the 1960s. The average life expectancy has increased by a stunning 5.5 years in the said period.¹ This increasing trend is expected to continue in the short-term future². However, here we are looking at only the averages and averages often hide important issues. It is imperative to dig deeper and understand the issues which are lurking in the darkness. On doing deeper research, it is shocking to see how many significant threats there are to the future life expectancy. In the following section, let us take a focused look at some of the major challenges.

Major challenges affecting life expectancy

The major challenges affecting life expectancy can be broadly categorized as follows:

1. Psychological challenges
2. Climate-driven challenges
3. Air Pollution
4. Socioeconomic challenges

Let us now take a detailed look into how each of the above four factors is affecting life expectancy and take note of possible ways to address them.

1. Psychological challenges



The above graph presents a shocking representation of the recent decrease in life expectancy in the United States of America. Research suggested that the decrease was brought about by the opioid crisis.³ Further research indicated

there was more to the decrease than just opioid crisis. It was observed that deaths from suicides, drug abuse, and alcoholism i.e. diseases of despair were a key factor in the decrease of life expectancy.⁴ As per the Centre of Disease Control (CDC), in 2016, 88,000 deaths were alcohol abuse related, 63,500 deaths were drug-related, and close to 45,000 deaths were suicides. Although the number of deaths related to alcohol abuse alone are more than those related to HIV/AIDS at its peak, the budget allocated to tackling all three aforementioned issues is paltry in comparison to that allocated to HIV/AIDS.⁵ While HIV/AIDS is important, the psychological challenges need a much larger budget. The recent cuts to budget further worsen the situation. In today's digital world dominated by social media, psychological issues such as loneliness are only increasing.⁶ Therefore, tackling psychological issues by dedicating financial resources and using policy instruments is critical to ensuring that life expectancy continues to increase.

2. Climate-driven challenges

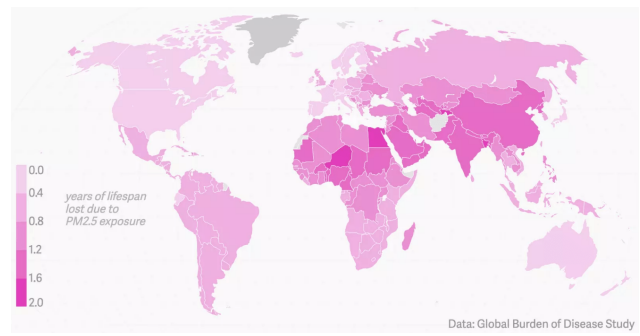


As per the Intergovernmental Panel on Climate Change⁷ the world on an average has already warmed by close to 1 degree Celsius. However, different regions are being affected in different ways. Some areas are becoming drier and some are wetter, but different seasonal variations are moving to extremes and weather in general is more unpredictable. Irrespective of what the unpredictable or extreme change is, climate challenges are already here, and the vulnerable sections of the population face a

higher risk than average. A prime example of climate-driven challenges is the chronic kidney disease. It is a product of the dehydration induced by heat stresses. Its impact has been severe on the sugarcane farmers in El Salvador, and life expectancy is being negatively affected as a result. To put things in perspective, almost 25% of the inhabitants of the Bajo Lempa region are affected by the chronic kidney disease.⁸ At this time, the disease has only been classified as climate-sensitive, but it is certain to move into the climate-driven category if nothing is done to salvage the situation. The research community has already started looking at diseases arising due to heat stresses and the resulting water shortages. The various suggestions to tackle this situation include adequate hydration, regulating work hours and conditions to keep away from extreme heat, appropriate ventilation, and lightweight clothing.

As per the IPCC, while some regions will get hotter and experience heat stresses, some other regions will get wetter and experience flooding, especially coastal regions. This flooding and leftover pools in brackish waters will be fertile breeding grounds for mosquitoes and other disease carrying vectors. All these vectors mean an increased disease burden, which naturally has a harsher effect on the vulnerable population i.e. young babies and old people. There are also other regions which will be affected owing to an increased disease burden. Increased temperatures mean that higher altitudes increasingly become accessible to various insects including mosquitoes. That in-turn means new diseases reach higher altitudes. All these adverse effects of climate change necessitate strong and coordinated action on climate change by public sector, private sector, and citizens. The key point here is to not focus on just that, but to proactively plan for climate resilience, especially protecting our vulnerable population - old people and young babies. It is critical to direct healthcare and social services spending for the above point. A much necessary solution for regions with heat stresses would be to provide accurate, area specific, and hourly weather updates to help people plan their clothing, work times, and the like. An out-of-the-box solution could be to design something like a healthcare village in a location which has good climatic conditions. In addition, design green spaces with focus on ease of access, stimulating positive social interactions, ease of delivering healthcare services, and providing a sense of joy, community, and fulfillment i.e. providing top quality of life in old age.

3. Air Pollution



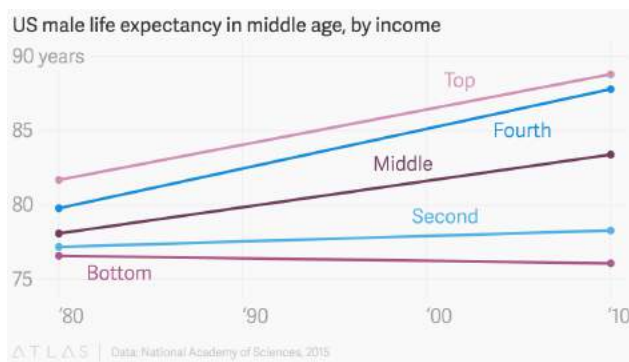
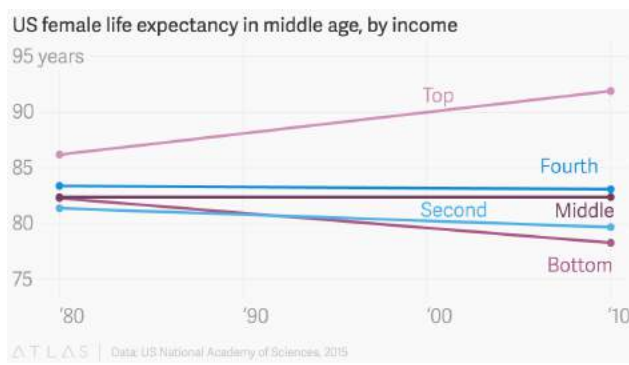
As is visible from the map above, air pollution is already causing significant damage to life expectancy even when considering averages. In the words of the World Health Organisation (WHO), air pollution is the environmental health risk humans face.⁹ As per its estimates, indoor and outdoor air pollution combinedly are directly responsible for one out of nine deaths globally.¹⁰ Globally, the average life expectancy at birth is decreased by one full year due to outdoor air pollution. The effect is different across different countries, some severely affected and some not so much: the average life expectancy in Egypt was reduced by 1.9 years and the same figure in India was reduced by 1.5 years. On the lesser side, the figure was reduced by around nine months for Russia. Talking about the other side of the coin, life expectancy in South Asia was reduced by an additional 1.2 years due to exposure to indoor air pollution – created by cooking with animal dung, wood, or charcoal.¹¹ In a peer-reviewed study¹², researchers found a strong correlation between air pollution and reduced life expectancy. When controlled for other causes which negatively affect health, for example, smoking, researchers observed an average life expectancy decrease of 3.1 years due to cardiorespiratory diseases, such as lung cancer.

When we talk about air pollution affecting health, we are mainly concerned with two kinds of particulate matter – PM10 and PM2.5. These two particulate matters affect the body and its health differently. As per scientists, every additional 10µg/m³ of PM10 in the air decreases life expectancy by about seven months, whereas a similar amount of PM2.5 reduces life expectancy by a full year. PM10 can lodge deep in lungs and cause respiratory disease, but PM2.5 is considerably more dangerous. PM2.5 particles are small enough to enter the bloodstream and even the brain. Research has indicated that PM2.5 has an adverse effect on cognitive functioning, particularly in young children and old

people, and can lead to diseases such as Alzheimer's and dementia.¹³

All the above information means that it is of critical importance to reduce particulate emissions and protect our old people. Sources of PM2.5 include wildfires, dust-storms, vehicular emissions, and coal burning power plants. Furthermore, greenhouse gas emissions and sources of particulate matter, PM2.5, are strongly linked, so efficient transport and clean electricity will have a direct positive impact on health of the local population. Additionally, the fact that trees can filter out PM2.5 from the air underscores the need for us to ensure enough tree cover in urban centres, especially the polluted places.¹⁴ This further adds fuel to the out-of-the-box idea of healthcare villages mentioned in the previous section. We must take urgent action, especially through policies, to protect our young children and old people from the menace of air pollution and keep the life expectancy high.

4. Socioeconomic challenges



Inequalities are a painful reality of today's world. The above graphs are a small example of how socioeconomic inequality and the resulting health inequality is affecting the life expectancy of the people at the bottom of the economic pyramid.¹⁵ In a study comparing data from seven high-income WHO member countries, the

following was found: "Low socioeconomic status was associated with a 2.1-year reduction in life expectancy between ages 40 and 85 years, the corresponding years-of-life-lost were 0.5 years for high alcohol intake, 0.7 years for obesity, 3.9 years for diabetes, 1.6 years for hypertension, 2.4 years for physical inactivity, and 4.8 years for current smoking."¹⁶ So, while the rich are able to live increasingly longer, the poor are either not experiencing any benefits or, in some cases, experiencing a decrease in life expectancy. For example, a study published in the Lancet regarding the recent drop in life expectancy said, "the poor recent and projected US performance is at least partly due to high and inequitable mortality from chronic diseases and violence, and insufficient and inequitable health care."¹⁷ Other studies have shown that this could be owing to a higher occurrence of traditional risk factors such as poor diet, alcoholism, and smoking. It was further noted that these traditional risk factors are higher in people from low socioeconomic classes owing to high income inequality and psychological factors such as bad upbringing and social exclusion. To effectively tackle this issue, researchers suggest that measures need to be directed at the root causes. Some critical steps would include creating safe atmospheres for children born into low socioeconomic classes, improving education facilities, reducing poverty, and safeguarding the low socioeconomic classes from the dark side of the society. By undertaking the aforementioned measures, we would be able to reduce the socioeconomic inequality in the long-term. A final nail in the coffin of health inequality would be to ensure adequate budget for health and social services, and later support that with equitable delivery of services to the socioeconomically weak sections of the population.

Conclusion

As seen from the data and research highlighted in the previous section, we are already seeing negative effects to life expectancy in some regions and communities. It is a boon that the average life expectancy across the world is increasing steadily, supported by various factors including medical advances and forward-looking policies. Now, it is important that we do not rest on our laurels and take the necessary steps to address the issues detailed above i.e. psychological challenges, climate-driven challenges, air pollution, and socioeconomic challenges.

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The Individual and Global Economic Consequences of the Longevity Revolution

Submitted by Hedwige Serot Almeras

This executive summary looks into the demographic challenge of increasing longevity that the world is facing today. We will focus specifically on several consequences that a longer life entails on different levels; looking into three major ones into more details, with a particular insight on European countries. After overviewing the significance of this demographic change, we will establish that not all countries are equal in the face of this challenge, and then dive into specific consequences related to health, personal and public spending, as well as manpower.

The Longevity Revolution

The world is currently facing unprecedented demographic challenges. Humankind longevity changes is one of them, with numbers rising remarkably worldwide. Indeed, over the last 100 years, the world has witnessed a significant increase in countries' life expectancies. From a world average of 52.6 in 1960, the life expectancy at birth is currently at 72 years old and is expected to continue increasing to more than 80 years old in 2100. (WHO, 2018) Although that of developed countries, e.g. Western Europe and North American countries, started to increase earlier, former developing countries have seen a more rapid increase in life expectancy, and progressed so fast that they have now caught up or even surpassed them - as it is the case with Japan for instance - in the second part of the 20th century.

Improvements in health care and measures, better diagnosis and management of infectious diseases, a more widespread access to clean water, better nutrition, living and working conditions, as well as technological progress and innovation are responsible for this increase. As fertility rates are not following the same trends, this will lead to a change in the world populations' age structure; countries will likely see imbalances as there will be more older people than young people, particularly in developed countries. Different scenarios for the future exist, based on scholar's differing views: longevity could keep increasing at the same or at an even faster rate thanks to scientific and technological innovations, but it could also stall or even decrease, according to some other researchers. However, we will not go into details about these scenarios here, and we will assume that human's life expectancy will continue to rise.

Two schools of thoughts developed on this topic. The first views this longevity revolution as an

incredible opportunity and one of society's greatest achievements, and stresses that we should do all that we possibly can with our technology and scientific knowledge to help further increase humankind's lifespan. On the other hand, the second believes it is rather a disease that should be cured, that we should fight, as it is an unsustainable burden for people to bear. Whereas in 1800, no country had a life expectancy above 40 years old, we are now talking about the 100-year life. However, there is also a scientific consensus on how long human can actually live. While some scientists are now proclaiming that there is no limit to human life, others are saying that it is scientifically impossible to live beyond a certain age threshold.

This raises another question; that of health longevity. It is one thing to acknowledge that the world population is becoming older and will live longer, but it does not address the issue of the conditions in which these older people will be living. Access to health is a major point of concern with an ageing population, and if this extra life is not in fact as healthy as we would hope, we can wonder who will care for them, and how. In fact, it will likely create a burden on their families or on societies as a whole. Therefore, countries need to stay ahead of this demographic change by thinking about implementing policies for ageing people. On the other hand, if we consider that seniors' increased life will be a healthy one, then the consequences will be much different, and we will have to think about restructuring the manpower pyramid and retirement age among others, to account and take advantage of these longer active lives.

Global Inequalities in Caring for Senior Citizens

The Global AgeWatch Index of 2015 from HelpAge covers four domains: income security, health status, capability and enabling environment. By taking into account several factors per domain, such as life and healthy life expectancy at 60, pension systems, welfare, wealth and employment of older people, as well as overall environment factors that enable senior citizens to function independently (e.g. social connections and civic freedom); this index gives insights on how much seniors' situation and experience should vary depending on the country they live in. What is interesting in this particular study, in addition to highlighting the inequalities of the

world between higher- and lower-income countries, is that they not only consider economic factors, but also the wellbeing and engagement of older people in their respective countries, which is crucial as well.

Indeed, some regions of the world display barriers to health care, limitations to the coverage of pension systems (only 1 out of 4 people over 65 receives a pension in low- and middle-income countries according to a research conducted by the International Labor Organization in 2014), an uneven access to the labor market, and/or an environment that does not help them be engaged in their community and be free and autonomous in their later lives. Although we acknowledge that these inequalities are very much present and will have an impact on countries' abilities to address the challenges of longevity, we will establish the major consequences of life expectancy increase without regards to countries' specific situations.

A longer healthy life?

Most of the previously mentioned consequences were based on the assumption that this longer life will not necessarily be healthy. However, healthy life expectancy is a key measure that needs to be considered here as we look into the future consequences of this demographic change. Indeed, a longer life does not necessarily equate to a longer healthy life: life expectancy and healthy life expectancy do not necessarily grow together in a similar fashion. It is thus interesting to compare countries' life expectancy and healthy life expectancy. (*Appendix 1*)

As we can see from this table, there is a discrepancy between the two measures - that of course varies depending on the country we are looking into, due to the inequalities previously mentioned. It is also interesting to note that the difference between life expectancy and healthy life expectancy at birth in 2016 is higher than that between the two variables at 60 that same year. Indeed, if we look at the average of the differences, which thus corresponds to the remaining "unhealthy" years, we see that it is 4.6 years at 60 years old, whereas at birth it is 8.5 years. This means that people born in 2016 will have more unhealthy years in their later life than people born in 1956, suggesting that the longer life created by the longevity revolution might not in fact be that healthy.

As older people are more vulnerable to certain diseases, we might be faced with an increase of age-related diseases impacting senior citizens, that will have to be dealt with. The diagnosis, treatment and care of pathologies and diseases that will impact seniors, such as hearing loss,

arthrosis, diabetes, dementia, etc. will be more important than ever before. Indeed, in high-income countries, most older people die of an age-related non-communicable disease, such as ischemic heart disease, strokes, Alzheimer's disease or cancer, among others. This is not to be overlooked, as it will have impacts on seniors' need of and dependence on extra-help and support.

An Increasing Need for Support Systems

"Population ageing is projected to have a profound effect on societies, underscoring the fiscal and political pressures that [health and pension] systems of many countries are likely to face in the coming decades" (United Nations, 2017). According to the UN, the world population should reach 10 billion people by 2050. The number of people over 60 should double by 2050 and triple by 2100, rising to 2 and then 3 billion respectively. Similarly, they expect the number of elders 80+ years old to triple by 2050, reaching more than 400 million, and then rising up to 900 million by 2100. As the proportion of elderly people is expected to grow much more than the proportion of younger people, the fear is that this situation might create a heavy burden on these younger people, as well as put significant pressures on countries - and more specifically their policies and finances - that will need to find ways to support this increasingly numerous and older segment of their population. In addition, if we look at these numbers, we see that the proportion of people 80 years old and older in the elderly segment of the population (60+ years) is expected to increase: from 20% in 2050 to 30% in 2100, which is important to consider when we discuss elderly health care costs, old-age pensions systems, long-term care spending, etc.

This is particularly true of developed countries already today. 25% of the European population is already in that older segment of the population. The UN projects this number to increase to 35% by 2050. Therefore, for these countries, the issue of longevity is already very much a reality that they have to face: pensions and health care systems will have to be implemented or revised rapidly so as to account for the changes. Research has already looked into the consequences of this demographic change on public expenditures related to pensions and old-age support. At the EU-level, it was shown that public pensions expenditures should continue to rise, to reach a peak in 2037. The UN has also emphasized the significant impact this demographic evolution would have on public finances in Europe, mentioning that age-related government spending will

increase from 25 to 29% of GDP between 2010 and 2060.

“Growing public health care expenditure raises concerns about its long-term sustainability” (European Commission, 2015, pp.158). Indeed, this will put significant pressures on countries’ public finances, and although here we are focusing on Europe, the same remains true to some extent for the rest of the world. In addition to increasing pensions systems, services to individuals will have to increase and improve to account for the change: retirement homes, respite care, home help, and other services or products will have to multiply. Therefore, countries will have to balance the increasing needs for both better and more efficient health services, as well as health care financial support. Of course, as previously mentioned, this impact will depend on the state of this older life; whether it will be healthy.

A Changing Workforce Structure

Finally, if the population keeps ageing, a higher part of the workforce will be older. In combination to this, as fertility rates do not follow the same rate as life expectancy, the labor supply will decrease, and there will also be a shortage of young people of working age. Therefore, the pressures and burden on countries and individuals to support seniors will be even more important that the proportion of retired people will increase significantly compared to the share of working people. We will gradually assist to a shift in the workforce structure. (*Appendix 2*) The European Commission in their 2015 report illustrates this change by saying that the ratio of working-age people for every person over 65 will decrease from 4 to 2 working-age persons. In fact, in the EU, the effective economic old age dependency ratio should increase from 41.5% in 2013 to 64.5% in 2060 (European Commission, 2015; pp.59).

If nothing changes, countries will have to face the challenge of a decreasing labor supply, with a higher proportion of the population in retirement age. This could lead to reduced growth, or even stagnation: both corporations and institutions will need to prepare to this reality, as well as adjust and react appropriately to limit its impact. Of course, the consequences here will vary greatly depending on how healthy people’s ‘extra life’ will be, among others. If we suppose that innovation and progress will allow people to age yet remain healthy, the impacts and consequences on many levels will be much different than if they are suffering from diseases and are highly dependent on younger people during their ‘extra-years’.

The financial impacts from this shift start at the individual level. If retirement age does not increase much, then people will be working approximately the same amount of years as before but will have to support themselves in retirement for a longer period of time. Thus, they will either have to save more during their working years or spend less than older people do now during their retirement in order not to find themselves short on money too early on. This also relates to the challenge of keeping older people engaged in their community, and most importantly autonomous and independent, so as not to be a burden for their relatives who might need to help support them financially, or on society in general. This is something to consider from a younger age, as young adults might need to think about putting money aside from early on in order to cover for the longer retirement years.

If we want to benefit from the life expectancy increase, and the extra healthy years senior citizens will have, we could increase retirement age in order to take advantage of their additional productive years. It is important to find a way to seize the economic opportunities presented by this demographic change and potentially healthy ageing, by lengthening the time during which people are “net producers”, among others. This means trying to encourage people to work at older ages for instance. Research considers that “doing so would raise average overall purchasing power, making society more prosperous, and increase the scope for savings investment, which could accelerate long-term growth” (Eberstadt & Groth, 2007, pp.64). However, none of this is possible if the situation stays the same.

Conclusion

“Creating a better world for all ages is within reach” (HelpAge International, 2015). It is very important for countries to develop actions plans regarding their ageing population. It is crucial to think about implementing policies and programs to support older people both financially and socially, including them in society, enabling them not to depend on their relatives to support them, keeping them healthy, etc. Countries also have to think about dealing with the changing age-structure of employment that will result from the increased life expectancy and might have devastating impacts on economic growth. Although not every country has / can afford to have systems in place to provide pensions to its senior citizens, as inequalities remain, it seems many countries are on the right path to help older people by implementing social policies and support systems focused on elders. Western European and North American countries should be the leading

regions in providing security and wellbeing to its rapidly growing ageing population. The ultimate goal is to support older people financially and socially, allowing them to support themselves, live autonomously and be happy, active and healthy.

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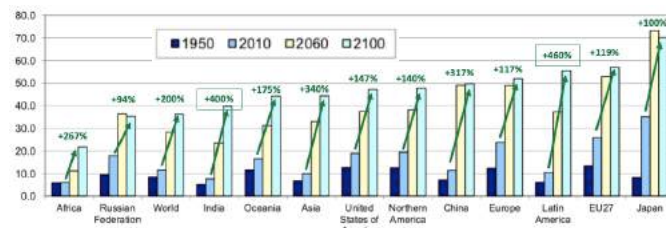
Appendices

Appendix 1 - Comparison between the Life Expectancy and Healthy Life Expectancy at birth and at 60 years old of 5 countries

	Japan	Switzerland	Brazil	Russia	Mali	Lesotho
LE at birth	84.2	83.3	75.1	71.9	58	52.9
HALE at birth	74.6	73.2	66	63.5	50.7	46.6
LE at 60	26.4	25.5	21.6	19.4	15.4	15.3
HALE at 60	20.9	20.1	16.7	14.9	11.5	11.7

Source: World Health Organization, Global Health Observatory Data, Life Expectancy & Healthy Life Expectancy, 2016
Note: LE = life expectancy & HALE = healthy life expectancy

Appendix 2 – Evolution of the Old-Age Dependency Ratio in the World between 1950 and 2100



Source: UN World Population Prospects: the 2012 Revision

Longevity of humankind

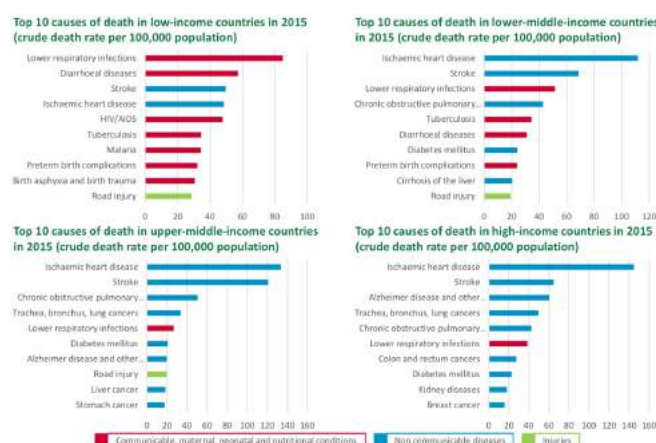
Submitted by Alexandre Wallemacq

Introduction

This executive summary examines the leading causes of death today in countries across the globe, with a focus on high-income countries, our current understanding of the origins of these diseases, which is closely related to the science behind ageing, and the arrival of a series of new biotech players providing alternative solutions and treatments. Based on this, we present a number of scenarios forecasting life expectancy with different degrees of probability.

Leading causes of death in 2015

Using the World Bank classification of countries in term of income, the World Health Organization (WHO) looks at the leading causes of death in low-income countries (gross national income (GNI) of US\$1,025 or less), lower-middle-income countries (GNI between US\$1,026 and US\$4,035), upper-middle-income countries (GNI between US\$4,036 and US\$12,475) and high-income countries (GNI above US\$12,476) in 2015. The WHO classifies these causes of death in three categories: communicable, maternal, neonatal and nutritional conditions (Group I); non-communicable diseases (Group II); and injuries (Group III).



As can be seen on the graphs above, the pictures look very different whether a country is in the low-income bracket or in the high-income bracket. The most striking difference between these brackets is the importance of the Group I, which represents 52% of all deaths for low-income countries and only 7% for high-income countries. Overall, the richer a country is, the more it is able to reduce or even virtually eliminate deaths from communicable, maternal, neonatal and nutritional conditions, with the exception of lower respiratory infections. The leading causes of death

become predominantly non-communicable diseases.

Having a closer look at the leading causes of death in high-income countries, we notice that the top spots are taken by the ischemic heart disease, the stroke, Alzheimer disease and other dementias and a variety of cancers such as trachea, bronchus, lung, colon, rectum and breast cancers. While going into the specifics of the description, causes and treatments of each of these diseases is beyond the scope of this executive summary, we can still clearly notice that they almost all belong to age-related diseases. They can happen at a younger age, such as the unfortunate cases of children with cancer, but they tend to appear at later stage in life. In short, we increasingly die from the consequences of ageing.

The science behind ageing

If we want to continue increasing life expectancy in high-income countries, we need to understand the science behind ageing. The problem is that, even today, the process of ageing eludes scientists. The WHO explains it as follow: "At the biological level, ageing results from the impact of the accumulation of a wide variety of molecular and cellular damage over time. This leads to a gradual decrease in physical and mental capacity, a growing risk of disease, and ultimately, death". But what causes these damages? What are the factors affecting ageing? And is there something we can do?

The reasons why we are actually ageing still puzzle scientists and are the subject of much debate in the scientific community. But the factors impacting ageing are relatively straightforward. There are classified in two main categories: genetics and environment. For the first category, genetics, it has mostly to do with the DNA damage theory of ageing. People with good genes have a higher chance of living longer life and in better conditions. Since the 1990s, there have been considerable progress and biological findings in understanding what genes influence the ageing process of cells, especially in animals for obvious ethical reasons. Whether we can identify these genes in humans and act on them to delay or eliminate ageing is still very much uncertain, but the outlook tends to be positive.

Having good or bad genes is not at all the entire determinant in the ageing process. The second

main category of factors deals with the environment a person lives in. To give a very simple example, assuming that two twins share the same DNA, how is it possible that they still can show significant differences in term of longevity? In a paper named "Human longevity: Genetics or Lifestyle? It takes two to tango", Giuseppe Passarino, Francesco De Rango, and Alberto Montesanto argue that only 25% of the variation in human longevity is due to genetics and that the environment plays a very large role. Following a healthy diet, exercising on a regular basis, sleeping enough, not smoking, not getting sunshine for too long, managing stress, all decrease the chances of getting age-related diseases and lead to longer life expectancies. Of course, there are still questions such as to what extent each of these behaviors affects ageing and what are the best practices in each of these behaviors. Air pollution is also starting to become an important factor, playing a part in a third of all deaths from stroke, lung cancer and respiratory diseases.

The standard way to deal with age-related diseases at the moment is to treat them when they appear. If the treatment is successful, the patient gets to live longer, and we repeat this process until the patient dies. This method has been used for centuries and has been very effective for infectious diseases. But as we age more and more, this method will quickly reach its limits. For how long and for how many times can we patch someone up when every operation and treatment increase the chances of further complications? We are now witnessing a move from reactive to preventive medicine, which aims at combatting actively the sources of ageing, for instance with healthy lifestyle promotion campaigns and research in genetics.

Technology applied to healthcare

As said before, going over the exact description, causes and treatments of each disease is beyond the scope of this executive summary. However, looking at new trends arising from the massive information technology shift that we have witnessed these last decades is not. New biotech players are challenging existing practices and are trying to come up with innovative solutions. In this part, we will analyze a few of these trends, how they affect healthcare and provide a few examples of new players in this sphere. It is important to note that even though the players are new, there is still a strong tendency to work alongside traditional healthcare actors, such as large pharmaceutical companies and hospitals.

The first and most predominant trend is the rise of artificial intelligence and machine learning.

While they seem out of place and far off in certain industries, they are very much on point and used massively today in healthcare. Two use cases exemplify their importance. First, in term of disease identification and diagnosis, we have relied for a long time on specialists. Recently, they have been helped by advanced instruments such as scanners, X-rays and the likes. But nowadays, this goes even further. For instance, an AI system developed by European scientists was found to correctly diagnose skin cancer more accurately than dermatologists, respectively with 95% and 87% of success. Another important application of AI and machine learning is in drug discovery. Pharmaceutical companies spend an average of 12 years and billions in research and development to launch a new drug on the market. There is also a fear that we have only been able to grab the most obvious drugs and that we do not have the capacity to go much further with our brains alone. Using big data of established players, new players apply AI and machine learning, especially deep learning, to identify and test new drugs, offer potential leads, and draw new connections, just to name a few. Two players are very important in this new field: Google with Deepmind Health, and IBM, with Watson for Drug Discovery.

Another trend is the mainstream use of tracking devices and its underlying potential for disease prevention. Medical touchpoints have been very limited in the past. People would only go to their generalists or to the hospital once in a while, and only when they had a problem. The problem with this approach is that it is only targeted at reacting to situations, and with very little data. In high-income countries, smartphones, smartwatches and fitness tracking devices are becoming customary. This has profound consequences as they are constantly collecting data, which was unheard of previously. With the consent of the patients, medical providers can now make decisions much more accurately, inform people who present early signs of a disease and even recommend healthy behaviors or diets in case of a deficiency of vitamins. One category of actors in this area is, of course, the device manufacturers. But other players such as insurance providers are also entering the scene. A very good example is Discovery, a South African insurance provider, that offers lower premiums to policyholders going to the gym on a regular basis and using tracking devices. AIA Vitality is also offering lower premiums in Singapore to members who purchase healthy food in supermarkets with a special credit card. Overall, these tracking devices are also closely related to artificial intelligence and machine learning as they are feeding

data that can then be analyzed to further medical research.

Forecasting the increase of life expectancy

It is very important for governments to forecast different life expectancy scenarios so as to be prepared for what is coming and adapt the many institutions and building blocks of our society that will directly be affected such as state pension schemes. However, forecasting can be a difficult exercise and it is very common for economists and scientists to get it wrong. In this part, we will first look at a model combining a series of scenarios, based on historical data and current understandings of modern healthcare, but leaving the latest technological improvement out of it. We will then look at the Washington Longevity scenarios for 2030, focusing on potential technological advancements, but not near as credible as the first model.

Based on the paper “Future life expectancy in 35 industrialised countries: projections with a Bayesian model ensemble” by Vasilis Kontis, James E Bennett, Colin D Mathers, Guangquan Li, Kyle Foreman, and Prof Majid Ezzati, the first model encompasses 21 different forecasting models with weighted probabilities, to forecast the life expectancy increase between 2010 and 2030 in 35 high-income countries. This probabilistic model is called Bayesian model averaging (BMA) and is increasingly used for weather and climate forecasts. The advantage is that it does not restrict itself to one theoretical model and encompasses a broad range of views. For instance, both the optimistic model predicting a continuous increase in life expectancy at a similar rate as the one witnessed for the past two centuries, and the pessimistic model predicting life expectancy to stall due to obesity and other health hazards, are included.

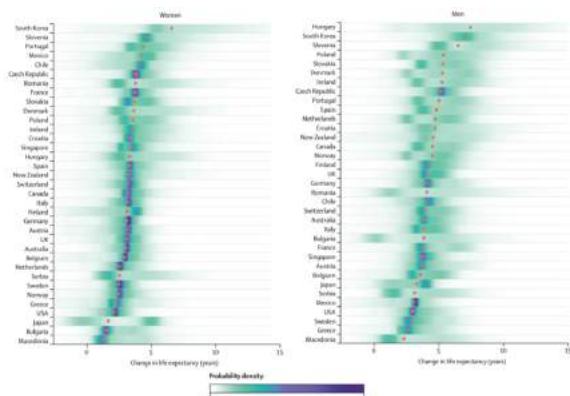


Figure 1: Posterior distribution of projected change in life expectancy at birth from 2010 to 2030. Red dots show the posterior medians. Countries are ordered vertically by median projected increase from largest (at the top) to smallest (at the bottom).

As can be seen on this graph, the likelihood that life expectancy continues to increase is very high. The authors even state that there is a 65% chance that life expectancy for women increases

in all 35 countries, and an 85% chance for men. South Korea leads in term of gains both for men, with a second place, and women, with the first spot. The life expectancy at birth for South Korean women in 2030 is expected to be higher than 86.7 years with a 90% probability, and higher than 90 years with a 57% probability, placing South Korea not only as the winner in term of gains, but even in absolute term. Overall, the expected average gain remains below 5 years for women and very close to 5 years for men. The pessimistic forecast for women is still a solid increase of around 2 years, while the positive forecast exceeds the 5-year threshold in most countries, even reaching 10 years in 4 countries. For men, the pessimistic forecast is also an increase of around 2 years, though slightly superior to the one observed for women. The optimistic forecast all exceeds the 5-year threshold and a 10-year increase is possible in more than 10 countries, even though it is very unlikely.

This BMA model represents a good synthesis of most commonly accepted forecast models, but it fails to acknowledge the possible revolution that information technologies could bring. To be clear, we recognize that the probabilities of a digital revolution happening to healthcare remains extremely low. But then again, we believed that Moore’s law would stop at some point and it has barely slowed since 1965. As these technologies start to be used for healthcare, we might witness surprisingly impressive results. That is where the Washington Longevity scenarios for 2030 come in. It was developed by Future Tense, a group including Arizona State University. They present 4 different scenarios for life expectancy increase focusing on technological aspects. Scenario A, small change, is the one they consider the most likely to happen. It says that these technologies will have very limited effects and, as a result, there will be little change to today’s predictions. This first scenario is then very similar to the results shown previously. Scenario B, drooling on their shoes, postulates that these technologies will allow people to live significantly longer, but that we won’t increase our healthy life expectancy. In short, we would just spend more time in retirement homes, trying to survive from one operation to the other. The costs for society in this scenario would be very important and we would have to rethink the whole pension system. Scenario C considers the possibility that these technologies, not only increase our life expectancy, but also our healthy life expectancy. In these cases, we would be able to live until 150 years old in healthy conditions. This would obviously change society as we know it, offering people choices they never envisioned before. Scenario

D is the most extreme one and the least likely to happen. In this scenario, we would have overcome ageing and would be able to leave forever. Even though it is highly improbable, they do not rule it out as they explain that, if the improvement brought by digital technologies increase at a faster rate than we age, we could in theory live forever.

Conclusion

For the past 2 centuries, life expectancy has for the most part continuously increased, with an average increase of around 0.25 years each year. Among the many factors that contribute to these increases, the decline of communicable, maternal, neonatal and nutritional diseases played an important role. Unfortunately, these diseases are still important in the low- and lower-middle-income countries. Richer countries have managed to overcome many of these diseases and their populations now mostly die of age-related diseases. The process of ageing is the next obstacle that we face in order to improve both the life expectancy, but also the healthy life expectancy. While this process is not yet fully understood by scientists, its mysteries are slowly unraveling. Moreover, in the digital age, we can expect the technologies to keep pushing our life expectancy, though we are still uncertain to what extent. Overall, we expect life expectancy to continue increase across the globe at slightly lower, but still significant rate for the next decades.

Demography and Digitalization: How can Blockchain and digital assets help to make longevity an opportunity?

An analysis with emphasis on existing blockchain solutions in healthcare

Submitted by Thomas Baer

Global Demographic Change & Longevity

Population aging is a dominant demographic phenomenon in the 21st century. A shift in global demographics of such proportions is unprecedented in human history and brings with it a myriad of challenges and implications. There are three main drivers of the aforementioned phenomenon; fertility, migration and longevity.

Fertility rates are dropping globally, not only in developed but also in developing countries. The latter have experienced a decline in birth rates due to the increasing availability of contraceptives, education on the subject and the fact that increased availability of education can delay marriage. On the other hand, fertility rates are pushed down in developed countries due to the omnipresence of contraceptives and the high opportunity costs associated with having children. These factors have led to a stark reduction of fertility globally, which makes this driver the most dominant out of the three.

The second factor significantly contributing to demographic changes is Migration. These streams often occur from developing countries to developed countries, as young people migrate in the hope of living a better life. Such movements are highly volatile over time and tend to lead to an older population in the origin countries and a younger one in the recipient countries.

The final considerable factor for demographic change is longevity. Similar to the declining fertility rates, the trend of increasing life expectancy is occurring in both developed and developing countries, albeit on a different scale. Developed countries are benefitting from rapid advances in healthcare, with new technologies and medicine allowing for a healthier and thus longer life. Combined with a shift towards leading a healthier lifestyle, populations in developed countries are getting substantially older. In developing countries, life expectancy is still lower than in developed countries, however, on a rapid upward trajectory. A large part is due to the decline in infectious diseases through immunization (Bloom & Luca, 2006, pp. 14-33).

When analysing the political, economic, social, technological, environmental and legal aspects surrounding longevity, one quickly realizes that

the healthcare sector is especially impacted. As such, the focus of our group work has been put on healthcare and how blockchain can be utilized in this sector to not only use longevity as an opportunity but also increase it.

Blockchain – an Introduction

In order to understand the impact and potential of blockchain solutions in the healthcare sector, one must first grasp the fundamentals of this disruptive technology.

Created in 2008, the original purpose of blockchain was to enable bitcoin - a cryptocurrency. However, the possible applications of the technology itself are a lot broader. It is important to note that there is not just one blockchain but rather a myriad of different blockchains that can be used for multiple purposes. A blockchain functions as a distributed ledger technology that can track and store all types of data from financial transactions to medical records. It stores the information chronologically by adding new information in “blocks” to the already existing “blocks” of information, thus creating a “chain of blocks” – a blockchain. Any changes to previous entries can only be made by adding a new block stating that X has changed to Y. As a result, the information stored on the blockchain is non-destructive. In addition, the information is stored across a large network of computers, rather than centrally on one server. This decentralized way of storing the information creates trust, as the whole network of computers is required to verify any information before it can be added to the blockchain. Hence, tampering with the information is practically impossible. Seeing that the information on the blockchain can be trusted, as it is verified and cannot be altered, blockchain technology enables the elimination of a middleman, who was traditionally tasked with verifying and guaranteeing the faultlessness of the information. As a result, time and money can be saved, while limiting exposure and risk (Krawiec et al., 2015).

Finally, there are three fundamental types of blockchain that differ in the way people can interact with them; public, private and hybrid public-private blockchains. A public blockchain is open to everyone with regard to adding and viewing

information. The opposite, a private blockchain, can only be accessed and used by a select group of people (e.g. a company). A hybrid blockchain can for example make the information public for viewing, however allowing only a few to add information. It can also allow only a specific part of the information to be public, while giving full access to a select group of people (Brody et al., 2017, p. 3).

While blockchain may sound very promising in general, the technology is not without its faults. One of the biggest problems with blockchain is that barely anyone really understands the technology and how to use it. As such, it is extremely difficult to implement blockchain solutions on a larger scale. Akin to the internet, blockchain will most likely take time until it can reach its full potential.

Nonetheless, due to the large potential blockchain has with regard to storing and sharing information, it can be extremely useful in the healthcare sector, where sharing new discoveries and comparing patient data is of paramount importance.

Existing Solutions in Healthcare

To date, there are a myriad of companies operating in the healthcare sector and using blockchain technology – many of which have already received significant funding.

These companies have been allocated into four groups depending on their value proposition as depicted below.



Figure 1: 4 Applications for Blockchain in Healthcare. Own depiction, based on Close et al., 2018, p. 2.

For our presentation, two existing companies that focus on accelerating R&D processes in healthcare were examined, as we have found that companies in this group not only have the biggest impact on longevity but also use longevity as an opportunity. We have chosen the companies Doc.ai and Ocean Protocol because they have already received substantial funding, 12.3 million and 22.1 million respectively, and since they have both passed the initial stages of a start-up (Crunchbase, 2018a, 2018b). Doc.ai already boasts a functional demo app, while Ocean Protocol has a roadmap and a repository in place

with a demo to follow soon (ICO Holder, 2018; Doc.ai, 2018).

Doc.ai is a blockchain based AI platform that collects user’s health data, encrypts it and stores the information anonymously. The programme then structures and analyses a customer’s data and compares it to the database of information it has collected to give insights into a customer’s current health condition on one hand, while also predicting a user’s future health state. The app can be paired with wearable devices such as a smart watch to quickly and conveniently collect data. Through the mammoth amount of data that is collected and compared and its predictive nature, Doc.ai can give precise diagnostics, potentially saving lives. While the App does not replace a doctor yet, it can make customers aware of certain issue in time to see a doctor (Doc.ai, 2018).

Ocean Protocol is a marketplace for assets (e.g. data, algorithms) and services (e.g. processing, storage) that are shared anonymously and can be bought safely with a cryptocurrency (Ocean Token) (Ocean Protocol, 2018). The firm puts data providers in control of their information allowing them to monetize it by selling it to data consumers on a tokenized (based on a cryptocurrency) platform. By making more data available through such a platform, people conducting R&D can make use of an ever-growing database of information and ultimately accelerate and improve their findings.

Possible Future Solutions

The allocation of existing companies into the four groups has shown that the highest potential for future blockchain solutions can be found in the category of transforming service delivery in healthcare. As such, two hypothetical blockchain applications were created with said focus. The two solutions intend to show the possibilities of future blockchain solutions in healthcare, while putting less emphasis on their feasibility in the near term. Figure 2 below depicts the two existing solutions already mentioned and the two future applications being discussed in the following.

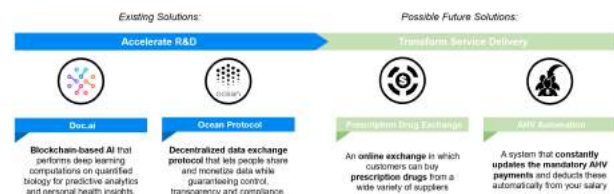


Figure 2: Existing and future solutions analysed.

The first idea focuses on solving an inherent problem in Switzerland. Due to longevity, people are receiving their pension for a longer period.

Since all payments made towards the AHV are immediately distributed to pension receivers and combined with a decreasing fertility rate, the question stands – will there be enough people in the future to support an increasingly old population? One possibility to mitigate this problem would be to introduce a blockchain based programme that collects all pension related information over time and combined with artificial intelligence constantly monitors these statistics. The programme could then detect at which point there would be a deficit/surplus in the pension pot and could automatically adjust the contribution of each person proportionally. For example, the programme detects that there are not enough people obligated to contribute to the pension fund to support the older population. It would then automatically adjust each person's contribution to close the gap of the deficit. This can work in both directions, as payments would be lowered in case the contributions are too high. Also, due to the adjustments being made automatically - without losing time through new policies and voting - the programme could eliminate scenarios in which there is a large deficit/surplus in AHV funds.

When looking at the impact the AHV automation solution has on longevity, one realizes that while it does increase the quality of life for the elderly by guaranteeing financial security, the programme focuses on using longevity as an opportunity. An aging population creates the need to transform an existing system and the solution leverages this trend to revolutionise the AHV system. On one hand, the idea shows the great potential of blockchain in combination with other digital assets and how longevity is being used as an opportunity. On the other hand, the idea is challenging to implement, as a lot of political changes would be involved, which is hard to imagine in a system as rigid as the Swiss democracy.

The second possible future application is the prescription drug exchange. Since the first idea focused on using longevity as an opportunity, this possible application has a larger impact on longevity, but does not really use it as a chance. The whole concept is based on the use of smart contracts, which is a smart programme based on blockchain technology that operates like an if-then function. A smart contract can check if certain prerequisites for a transaction are met and if so, executes it automatically. The drug exchange is a platform on which pharmaceutical companies can sell prescription drugs to customers without the need of a traditional middleman such as a pharmacy. A customer can purchase

medicine by uploading his/her medical profile, which will be checked against the prerequisites of the purchase for a specific drug. Should they match, the purchase is executed automatically. Since the underlying technology would be a blockchain, the patient's information could be uploaded anonymously and securely. In addition, the accuracy of the information on the profile would also be guaranteed.

As an example, a person seeking to buy an asthma spray can go onto the platform, look for the product and then upload his/her medical profile. Once the smart contract confirms that the patient is in fact eligible to purchase an asthma spray, the exchange takes place. Subsequently, the supplier does not need to deal with a middleman and can be certain that the drug is being sold to the right person. The customer on the other hand can benefit from being able to purchase prescription drugs conveniently and swiftly from anywhere. The costs of the medicine may also be lower than when being sold through traditional channels such as a pharmacy.

The impact on longevity becomes clear, as patients can purchase possibly life-saving medication quickly and securely. Improving access to such medication can ultimately increase life expectancy and thus impact longevity. The challenges with this application lie in the fact that established medical standards and laws would have to be altered for this platform to become a reality. Traditionally, a patient needs to have a certified doctor prescribe the medicine for him/her to purchase it. Since the drug exchange would eliminate these visits to a doctor and solely rely on a medical profile - which may not be up to date at all times – it could be difficult to implement.

Conclusion

After having analysed the changes in global demographics, with a specific view on longevity, we have found that the healthcare sector is significantly affected by these developments. As a result, the decision was made to analyse how blockchain technology, in combination with other digital assets, can use longevity as an opportunity in the healthcare sector. Having found a myriad of start-ups already using blockchain and its decentralised storing capacity in the healthcare sector, it quickly became evident how befitting the technology is to accelerate advancements in this industry. This became even more apparent, as many of these start-ups already have a working demo on the market and have received substantial funding. Categorizing the existing blockchain solutions into four groups

illustrated that the majority of the companies focusing on accelerating R&D processes use longevity as an opportunity and have the largest impact on longevity as well. Hence, a closer analysis was conducted on two firms focusing on accelerating the R&D processes in healthcare. The first provided personalized medical assistance through data collection and AI, while the second solution provided a data marketplace that can potentially accelerate R&D processes. Following the examination of existing solutions, two hypothetical solutions were introduced, which both put an emphasis on creating or transforming a service. This emphasis was made against the backdrop of realising that the highest potential for new ideas could be found in transforming a service delivery. One future solution focused on creating a prescription drug exchange, providing life saving medication to patients quickly and conveniently, thus improving life expectancy. The second solution aimed at revolutionizing the AHV payment system. By monitoring demographic changes and automatically changing individual payments, the pension deficit issue could be solved. The latter solution focused on using longevity as an opportunity to change an established system while the first aimed at increasing life expectancy and thus improving longevity.

The overall analysis has shown that blockchain will most likely play a decisive role in transforming the healthcare industry in the future by using longevity as an opportunity for new solutions.

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An analysis with emphasis on global demographic change and blockchain technology

Submitted by Gian Studer

Global Demographic Change

The 21st century's dominant demographic topic is the aging of the population. The amount of elderly people is growing in both absolute figures as well as percent of total population across the globe. The three main drivers of this phenomenon are fertility, migration and longevity (Bloom & Luca, 2016, pp. 14-15).

Fertility is the most important one of the three drivers. The level of fertility differs significantly depending on the country or region being looked at. It ranges from 1.6 in western countries to about 4.7 in African ones. The numbers, however, are dropping all over the world. The reasons for this trend differ depending on whether the country is a developing or a developed country. For developed countries, one reason for declining fertility rates is that the opportunity cost of children has been rising in the past few decades. In the current post-war era, women face increased labor market opportunities and continuously rising wages. This leads to higher cost of childbearing and thus to lower fertility. Additionally, parents nowadays seem to substitute child quantity for child quality. Lastly, broad access to birth control like the pill and the legalized abortion further suppress the fertility rate (Bloom & Luca, 2016, pp. 14-23).

In developing countries, the main reasons for declining fertility are introduction and improved availability of contraceptives as well as family planning programs (e.g. China's one-child policy). In addition, (higher) education for women often delays marriage and therefore reduces fertility (Bloom & Luca, 2016, pp. 23-28).

Migration has an effect on both, the origin as well as the receiving country. Since immigrants tend to be of young age, they usually increase the share of older people in origin countries and lower the average age in recipient countries. The overall evidence, however, suggests that migration has not been a major driver of population aging. Neither has it a big enough impact to revitalize aging societies with lower fertility rates. The effects of migration are even small when the migration flows are large. At last, migration opposed to fertility and longevity is rather unpredictable because it often happens out of emergency situations like for example wars or natural catastrophes (Bloom & Luca, 2016, pp. 32-33).

With regard to longevity, once again a distinction between developing and developed countries has to be made. This is because as with fertility, the differences in life expectancy between the two categories are quite significant. Life expectancy reaches from nearly 50 years in African countries to over 80 years in western ones. However, similar to the fertility rate, life expectancy is rising across the globe (Bloom & Luca, 2016, pp. 28-29; PopulationPyramid, n.d.).

In developed countries, the two main reasons for higher life expectancy are advances in medical technology and the decline in smoking (Bloom & Luca, 2016, pp. 29-30).

In developing countries, life expectancy is often lower than in developed countries, but has been on a rapid upward trajectory lately. This is mainly due to development of water supply, sewerage and immunization, which lead to a decline in influenza-related and infectious diseases (Bloom & Luca, 2016, pp. 30-31).

Lastly, life expectancy will continue to rise, but at a slower pace than before, and is likely to reach an upper limit (Bloom & Luca, 2016, pp. 31-32).

Since the above-mentioned central reasons for higher longevity are about improved healthcare (awareness), the focus will later be on blockchain applications in healthcare.



Introduction to Blockchain

Blockchain is a digital ledger technology (DLT) with the purpose of storing and sharing all kinds of data. It works on a non-destructive basis, which means that new entries can be made in a blockchain, but old ones cannot be deleted. This immutability makes a blockchain traceable and auditable (CIGI, 2018).

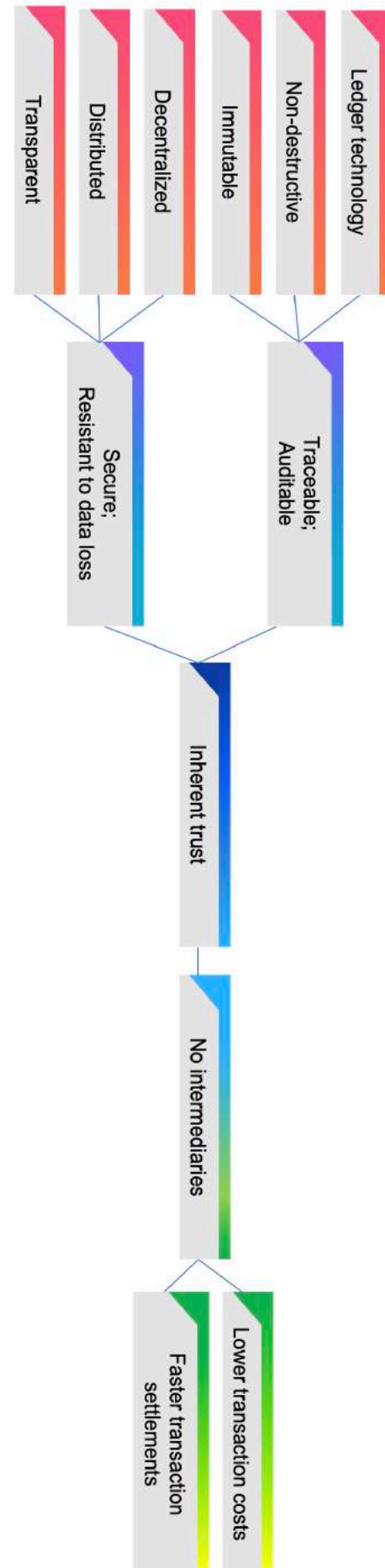
Aside from that, the information on a blockchain is not only stored on a single computer, but across its whole network. In other words, a blockchain is decentralized and distributed, which is one of its main advantages. This way, there's no single point of failure, which has two implications: Data cannot be lost because of malfunction of one single device and data cannot purposely be tampered with. So, for a hacker to manipulate a blockchain, he would have to alter the data on 51% of all participating computers, which is practically impossible if the network of computers is big enough. Those features make a blockchain resistant to data loss as well as manipulation and therefore secure (CIGI, 2018).

The technology, however, only allows the data to be distributed, not copied. So, each individual piece of data can only have one owner at a given time (this is very important if you think about money for example). This fact in combination with blockchains secure nature leads to inherent trust in the technology. An example helps to understand why this is so important. Forget about blockchain for a second. For example, when you buy a book on Amazon, you're relying on a financial institution like PayPal or a credit card company to verify that indeed you possess enough funds to buy the book and subsequently conclude the transaction. In other words, you need a trustworthy intermediary. But because blockchain comes with inherent trust, you can now cut out those middle men and save time and money in the process (CIGI, 2018).

In conclusion, the main benefits of the blockchain technology are its resistance to data loss and data manipulation as well as the possibility to eliminate intermediaries and thus save time and money (CIGI, 2018).

Before some concrete blockchain use cases can be discussed, it is important to understand that blockchain is a type of technology and thus there's not just a single network, but a wide variety of blockchain applications (CIGI, 2018).

The best-known application of blockchain is Bitcoin. Bitcoin is a crypto currency which acts like a normal currency except that it exists



exclusively digitally. The second most successful crypto currency is Ethereum (CIGI, 2018).

Blockchain is by no means only a way to store and transfer digital money. It can store and transfer any piece of information, like for example property rights, identity, medical records, or it can be used for voting systems or to trace a product back to its origins (CIGI, 2018).

The above-mentioned use cases mainly apply to public blockchains, which means that everyone who would like to participate can do so. But there are also private blockchains. These could e.g. be used internally by private companies for supply chain management, quality control of products or tracking of internal transactions (CIGI, 2018).

Lastly, smart contracts have to be mentioned as promising applications of the blockchain technology. Smart contracts act like small computer programs that conduct a transaction autonomously once all parties have fulfilled their pre-determined conditions. Preferably, the smart contract can even confirm the fulfillment of the conditions by itself.

Let's have a look at an example to better understand the concept of smart contracts. You might have heard of Kickstarter or Indiegogo, which are currently two very successful players in crowdfunding. Why do they enjoy such great success? They are platforms. In other words, they are intermediaries and gain a share off of every successfully launched crowdfunding project. They gather the money from the backers and keep it safe until the project either reaches its funding goal or the time limit for collecting is over. Then, those platforms will forward the money to the successfully funded project or, in case of failure, return it to the backers. Both parties (the backers and the project team) have to trust in the platform to handle the money according to the pre-determined conditions. That's where smart contracts could come in. A smart contract would allow for backers to donate money and would freeze that money until the funding goal or the time limit has been reached and then forward it to the party, which is now entitled to it. Sounds similar to the original approach? Well it is. Only that there is no third party involved anymore, which could theoretically have stolen the money by now or (more likely) have requested a fee for their service. Concluding, the usage of a smart contract in this case would eliminate the need for an intermediary and therefore reduce third-party risk while at the mean time save money and time for the backers as well as the project team (Simply Explained, 2017).

Existing Blockchain Solutions

The same attributes that enable secure and efficient financial transactions with cryptocurrencies by eliminating the intermediary can be applied in any data-intensive, highly regulated, and inefficient industries such as healthcare. Today's healthcare applications are still in their early stages of development. However, as part of this project, two companies with blockchain applications in healthcare were examined in more detail. The two were chosen because they already received funding and either released a demo version or presented a detailed roadmap. The two companies studied are Doc.ia and Ocean Protocol (Center for Biomedical Blockchain Research, 2018; Close, et al., 2018).

Doc.ia was founded in 2016 in San Francisco. It's a blockchain-based AI that performs deep learning computations on quantified biology for predictive analytics and personal health insights. This is done by collecting, structuring and analyzing users' personal health data to provide insights into their current condition and predict their future health. It can therefore help to increase life expectancy by improving diagnoses for individuals by making them faster and more objective (Bindi, 2017; Crunchbase, 2018a; Doc.ia, 2018).

Ocean Protocol, which has been founded in 2017 in Singapore, created a decentralized data exchange protocol that lets people share and monetize their personal data while guaranteeing control, transparency and compliance. It created the infrastructure to bring together data providers, data consumers, and service providers into one online marketplace. Private data providers can receive payments (Ocean Tokens) for publishing their data, while data receivers can buy said data, e.g. for R&D purposes. Ocean Protocol thereby enables the anonymous sharing of data and ensures a secure payment, both via blockchain (ICO Drops, 2018; ICO Holder, 2018; ICO Watchlist, 2018; Ocean Protocol, 2018).

By providing an easily accessible, large data base with a continuous flow of data, Ocean Protocol will make a large contribution towards faster and more precise insights in clinical pictures, disease symptoms and progression. This has the potential of enhancing R&D processes and thus increasing life expectancy by saving lives. The longer people live, the more data is available (more people & longer life spans) to be used in R&D – a virtuous circle (ICO Drops, 2018; ICO Holder, 2018; ICO Watchlist, 2018; Ocean Protocol, 2018).

Possible Future Applications

In a later part of this project, it was decided to shift the focus from existing blockchain solutions to possible future applications. In this context, brainstorming was conducted to develop ideas with realistic, practical implications. Two promising applications of blockchain were found: An automation of the AHV payment system and a prescription drug exchange platform.

The prescription drug exchange platform is an online platform where a customer's medical records can be checked for claims for prescription drugs. Only after approval, the user is given the ability to purchase the desired medication from a wide variety of suppliers – delivery service included.

The whole process is based on smart contracts and therefore runs completely autonomously. This makes it much faster and cheaper to get the drugs than the traditional way, because this process gets rid of the intermediaries – the doctors. It also reduces the price for the end customer because of increased competition of suppliers on the platform. Additionally, the users don't have to give up their identity and therefore can receive their prescription anonymously.

However, this platform would not only provide benefits for customers. From the supplier's point of view, there are three main opportunities: They can now reach more customers more easily, they can be sure that the medicines will not be sold to people who should not have access to them, and the intermediary is removed, which can improve their margin.

This solution therefore has an impact on longevity by providing patients with a faster, more convenient yet safer way of getting their medication while at the same time reducing costs for buyers and increasing margins for sellers.

The automated AHV payment system is a system that constantly updates the compulsory AHV payments and automatically deducts them from people's salaries. This is done by continuously monitoring demographic change and storing all AHV-related data on a blockchain. If AHV recipients increase, the system automatically calculates and executes any necessary adjustments to the AHV payments for each individual. This way, the "AHV pot" would always be large enough to support a constantly changing number of beneficiaries, which would ultimately solve the AHV problem we are currently facing.

Conclusion

In conclusion, it can be said that there's already a large number of promising blockchain applications in healthcare today. Some of which can e.g. be found on this website: <https://db.biomedicalblockchain.org/?info=function>. With regard to future applications, the combination of blockchain and healthcare looks very promising because the basic features of blockchain seem to harmonize (Center for Biomedical Blockchain Research, 2018) well with the needs of healthcare. Especially the large amount of unprocessed data that could e.g. be used in R&D but would have to be treated anonymously holds great potential. Additionally, inefficiencies caused by intermediaries could get resolved and bureaucratic processes could get speeded up, which would not only reduce costs but potentially also save lives.

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An analysis with emphasis on existing blockchain solutions in healthcare

Submitted by Nicolas Werner

Demographic change has an enormous impact on a global scale, challenging social, economic and political structures. Nonetheless, it also presents unprecedented opportunities that need to be recognized and seized. In combination with emerging technologies, such as blockchain, these opportunities can have a tremendous positive impact. In this management summary, the author evaluates how blockchain can help make longevity, a key driver of demographic change, an opportunity and how blockchain affects longevity in the long run. To introduce the topic, an overview on global demographic change and blockchain is provided. Subsequently, the author puts emphasis on currently existing blockchain solutions. Preceded by a glimpse into possible future applications, this paper is concluded by the key findings.

Global Demographic Change & Longevity

Fertility, migration and longevity, the key drivers of global demographic change, represent major issues we must learn to manage. Fertility is declining in both developed and developing countries, making it the main driver of population ageing. Major reasons for this development are increasing access to contraceptives and higher availability of family planning programs. Migration, on the other hand, is unpredictable and volatile. Generally, immigrants tend to be young, leading to a younger population in recipient countries and an older population in origin countries. Regarding longevity, a focus of this paper, findings consistently depict an increase in life-expectancy. In developed countries, advances in healthcare and increasingly healthy lifestyles are major drivers for further development. In developing countries, life expectancy may be lower, but is still increasing – especially due to a decline in infectious diseases because of immunization. (Bloom & Luca, 2006, pp. 15-30)

Longevity has a significant relevance on a global scale. An increased proportion of the elderly could shift the political climate. R&D in healthcare will be boosted due to an increasing demand and innovation, new laws will be required for said advancements, healthcare costs will be increasing, and the global footprint will be enlarged (Wheeler, 2010; Bloom & Luca, 2006, pp. 28-32). It becomes evident that one of the key fields connected to longevity is healthcare. This paper's focus will thus be on blockchain solutions

in healthcare, which impact or are impacted by longevity.

Blockchain

The hype around Bitcoin has been unmissable in the last few months. However, the technology powering Bitcoin, blockchain, is said to have an even broader impact. In short, blockchain is a distributed, decentralized database, or digital ledger, allowing a secure, transparent and traceable way to store and share any kind of data (Hutt, 2016).

Instead of storing data in a centralized system and needing intermediaries such as banks or hospitals, blockchain saves all its data decentrally and distributed over a large network of computers. As the name indicates, data put on the blockchain is stored in blocks. Each additional piece of data is stored in an additional block and saved over the whole network, leading to a linear, chronological chain of blocks. Moreover, if one wants to add an additional block to the chain, the network is required to approve said action. (Krawiec et al., 2016, p. 2)

Once accepted, each block includes a copy of the previous blocks' information using cryptographic signature, making the system highly secure. Data cannot be revised, and attempted alterations are visible to all participants of the blockchain. Therefore, the system creates a deep trust in the data it stores (Brody et al., 2017, p. 3). Application scenarios range from storing financial information (e.g. Bitcoin) to securing supply chains (e.g. tracing the temperature during the delivery of pharmaceuticals), or even storing property rights. With smart contracts, a blockchain's impact can be further increased: Integrated in the blockchain ecosystem, a smart contract is a program that concludes a desired transaction, once pre-defined criteria are fulfilled (Ballhaus et al., 2017). Looking at the supply chain example, a smart contract could trigger a bitcoin transaction as soon as the medication is delivered, and temperature limits have not been exceeded.

Existing Blockchain Solutions

Healthcare is one of the key fields impacted by longevity. According to The Boston Consulting Group, four high-impact scenarios for blockchain exist in the healthcare sector (Close et al., 2018, pp. 2-3; Center for Biomedical Blockchain Research, 2018):

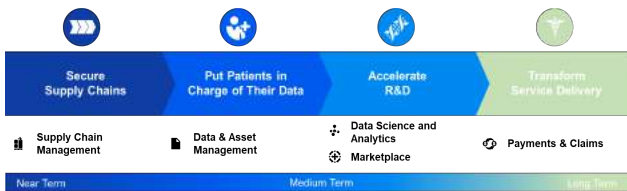


Figure 1: Four high-impact scenarios, own depiction

1) *Securing Supply Chains*: The blockchain technology stores all transactions chronologically and makes them unalterable. Therefore, pharmaceutical products could be tracked through every step of the supply chain, monitoring temperature changes or other malfunctions. Companies present in this scenario usually provide supply chain management solutions via blockchain.

2) *Put Patients in Charge of Their Data*: Blockchain can be used to store patients' medical records securely. Not only would it make medical records easier to manage, it would also put patients in charge of who could access their data. Firms active in this sector provide data & asset management via blockchain.

3) *Accelerating R&D*: Blockchain could revolutionize research and development. Researchers could gather medical data stored on the blockchain due to higher data availability, and the analysis of medical data could be improved using artificial intelligence. In this sector, firms either provide a marketplace for data or they offer data science/analytics services, all based on blockchain.

4) *Transforming Service Delivery*: Blockchain provides the opportunity for new business models. Solutions could range from easing the access to prescription drugs to revolutionizing health insurance using smart contracts. In this sector, only few companies exist to date, as these applications often require profound legal and societal changes. The few existing firms in this sector mainly focus on enhancing payments and insurance claims.

Despite being high-impact scenarios in healthcare, not all scenarios are equally relevant for longevity. Relevance regarding longevity can be twofold; solutions can either impact longevity or use longevity as an opportunity:

Securing supply chains can impact longevity, as it guarantees the medicaments' quality throughout the transport. However, it does not use longevity as an opportunity. Putting patients in charge of their data impacts longevity since relevant medical data can be quickly accessible in an emergency. It also uses longevity as an

opportunity because a longer life-span leads to more data available to enhance the individuals' health assessment. According to the author, the largest relevance regarding longevity, however, lies in accelerating R&D. A marketplace for data can increase longevity, as researchers can access previously unused data. A marketplace can also use longevity as an opportunity, as an ageing population leads to more data available for research. Data science/analytics can vastly impact longevity, as data analysis using AI can lead to new findings and cures. Furthermore, data analytics are more effective the larger the data set, thus also using longevity as an opportunity. Lastly, transforming the service delivery impacts longevity on multiple levels, e.g. by simplifying medication purchases. This sector might also use longevity as an opportunity, e.g. when discussing new insurance or pension systems. However, solutions in this area are currently at a very early stage, therefore not allowing the author to estimate their relevance at a high level.

Due to their high relevance, existing solutions accelerating R&D will be evaluated, both data science/analytics and marketplace related. As over 150 companies are offering blockchain and healthcare solutions, a structure was developed to decide which companies to analyze. Startups with past investments are structured according to proof of concept (displaying how feasible the product is) and the amount of total investments, (indicating the investors' belief in the company).

For data science/analytics firms, the following matrix results (Center for Biomedical Blockchain Research, 2018):

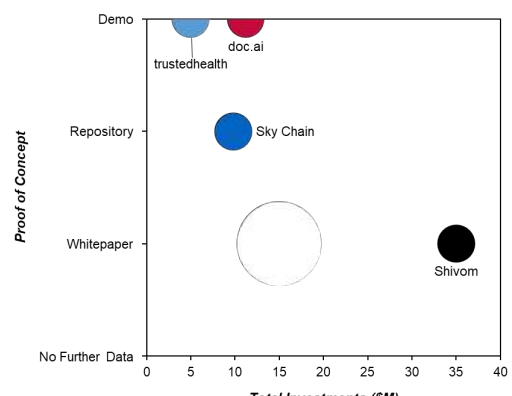


Figure 2: Existing data science & analytics startups, own depiction

Due to its existing demo and significant investments, doc.ai will subsequently be assessed. Doc.ai offers a blockchain- and AI-based doctor: It performs computations on medical data resulting in predictive analytics and personal health insights (Doc.ai, 2018). Doc.ai collects users' health data and stores it on the blockchain, securely, anonymized and decentralized, ensuring

data safety. Using artificial intelligence, doc.ai assesses the data and even provides predictions regarding future health states (Bindi, 2017). The firm recently launched a demo – an app targeting allergy diagnoses. Analyzing allergens, the substances causing allergies, is highly demanding, as they represent huge databases. Due to blockchain and AI, doc.ai can predict and assess allergies faster and more precisely. First, user data is gathered through surveys and health wearables, such as Fitbit. Then, comparing the user's data with its allergen database, doc.ai can provide information on which allergies affect the patient. Furthermore, it can create a personal health profile, providing solutions to reduce allergic reactions (Doc.ai, 2018; Bindi, 2017). Doc.ai is relevant regarding longevity for two aspects: First, it improves diagnoses for individuals, making them more convenient and non-biased. This may increase life expectancy and thus longevity. Second, it uses longevity as an opportunity, as a longer life-span leads to more data available for doc.ai to analyze, which then improves the accuracy of its predictions and diagnoses.

Regarding marketplace startups, a vast number of firms can be found, leading to the following matrix (Center for Biomedical Blockchain Research, 2018):

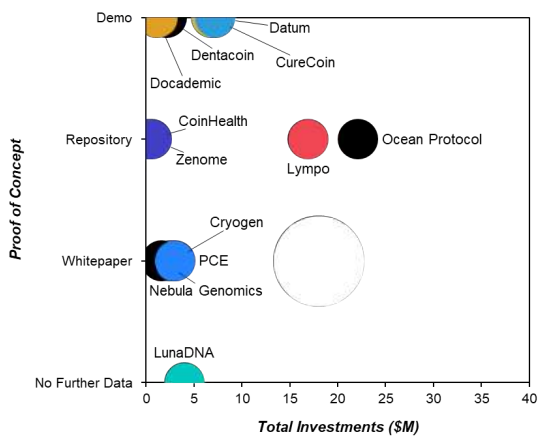


Figure 3: Existing marketplace startups, own depiction

As Ocean Protocol received the highest investments and – as proof of concept – provides its repository (proof of code), it will be evaluated below. Ocean Protocol is an infrastructure bringing together data providers and data consumers into a marketplace (Ocean Protocol, 2018). Based on the blockchain technology, it lets people share and monetize data while guaranteeing control, transparency and compliance. According to McKinsey, only 1% of data is analyzed today (Manyika et al., 2015). Ocean Protocol aims at increasing data usage by easing the sharing of data and incentivizing it using Ocean Tokens, a cryptocurrency created by Ocean Protocol. Once

data is shared, the data supplier receives the appropriate remuneration. Data suppliers are and will stay in control of who can buy their data. Verified data consumers, such as research institutes, can access the data by paying the required amount of Ocean Tokens. (Ocean Protocol, 2018)

Similar to doc.io, Ocean Protocol's solution affects longevity in two areas: First, the increase in data availability enhances R&D processes, leading to more precise healthcare insights and even impacting life expectancy. Second, the longer the average life-span of a person, the more data is available, further improving the accuracy of R&D. By storing data on a blockchain, Ocean Protocol increases trust in data sharing, patients' privacies are never endangered, and data providers receive the adequate remuneration for their contributions.

Possible Future Applications

As mentioned beforehand, the scenario of transforming service delivery requires profound societal changes, which is why few firms exist in this area. However, there is potential for future applications – two of which will subsequently be described: A prescription drug exchange and the automation of AHV payments.

By improving prescription drug purchases, an exchange platform could largely impact customers and suppliers. Using blockchain and smart contracts, patients could buy prescription drugs online, without the need of a doctor's appointment. Customers would upload their health data to the blockchain, where it would be stored securely. Suppliers could offer their prescription drugs online, with certain prerequisites that need to be fulfilled for a customer to purchase it. Smart contracts could check if the customer's health profile fulfills the prerequisites and – if it does – execute payment and delivery. This solution would strongly affect longevity, making it more convenient to get prescription medication quickly and securely, which may impact life expectancy overall.

A second possible future solution aims at the enhancement of the AHV system. A blockchain-based automated AHV solution could continuously update the mandatory AHV payments: As populations get older, a growing number of people are entitled to AHV payments. Therefore, the percentage of a person's income paid to the AHV pension would have to be increased. By storing all AHV related information on a blockchain and using AI to evaluate said data, the system could automatically calculate and execute any needed adjustments to the AHV payments. This system

would be relevant for longevity for two reasons: First, it would secure the availability of pension funds, which can increase the quality of life for the elderly. Second, the combination of blockchain and artificial intelligence uses changes in longevity as an opportunity, as it leads to an improved AHV payment system.

Conclusion

The objective of this paper was to evaluate how blockchain can help make longevity an opportunity, and how the blockchain technology could affect longevity. The discussion showed that healthcare is one of the key sectors impacted by longevity. For blockchain, a secure way to store data decentrally, there exist four high-impact scenarios in healthcare: Securing supply chains, putting patients in charge of their data, accelerating R&D and transforming service delivery. For existing startups, the highest relevance in regards of longevity can be found in accelerating R&D. Therein, companies offer marketplaces for data sharing, which could improve R&D, possibly increasing life expectancy. Other firms focus on data analysis, providing AI-based health assessments to enhance diagnoses, directly impacting longevity. As longevity leads to more data available, marketplaces and data analytics can use longevity as an opportunity to enhance data sharing and research. Future solutions can be found in the scenario of transforming service delivery: A prescription drug exchange could affect longevity as it would ease the purchase of life-saving medicine, while an automated AHV payment system could build on the changes in longevity to improve AHV payments.

Even though these solutions seem promising, it is important to recognize that the blockchain technology is in its early stages. Years of development are required and – more importantly – a change in laws and people’s mindsets is needed for these applications to be used on a large scale. Nonetheless, blockchain enables us to proactively tackle demographic developments and transform them into powerful opportunities.

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Geopolitics & Financial Markets

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Migration in and into Europe

Societal, political and economic impact in the past and in the future till 2030

Submitted by Luca Ernst

Migration and geographic mobility depict a major impact on societies, politics and economics. Hence, large flows of people usually positively and negatively affect both, the sending as well as the receiving countries. While the former often experience alleviation on their economies the latter potentially profit from cheap labour and increased cultural and religious heterogeneity. However, sending countries often run the risk of loss in talent and skill (i.e. brain drain) and host countries usually face an increased financial burden mainly with respect to integration costs.

Regarding Europe, one has to consider that the majority of European countries have experienced much more emigration than immigration until just two generations ago. This might help to explain why still today Europe's migration policies often lack coherence and selectivity (ESPAS, 2018).

European Migration: 20th Century – The period after WWII up until the oil crisis in 1973-1974 was mainly characterised by constant economic growth and development in the industrialised North-West. Native workers became increasingly educated and labour intensive and poorly paid vacancies (i.e. mining or construction work) could no longer be occupied. Another reason for a shortage in supply of labour was the increase in reconstruction work and the high number of working age men who lost their lives during war. Thus, European governments started to recruit people in Southern Europe. Migrants entering under such guest worker schemes were not intended to stay and thus granted fewer rights and little to no access to welfare support. The main exporting countries during this time were Italy, Spain, Greece, Portugal, Turkey as well as the former Yugoslavia. While Germany, France, Belgium, Switzerland, the Netherlands and Sweden were the main receivers of foreign labour. Another major cause for migration during this time was the ongoing decolonialisation that merely affected former colonies such as UK, France and the Netherlands. An influx of 10 million people into North-Western Europe is estimated between 1950 and 1973 (Bülent, 2002).

The oil crisis 1973-1974 adversely affected the economic landscape of Europe and consequently reduced the demand for labour. As a result, Switzerland, Sweden, Germany, Benelux and France invoked a migration stop. Newly

implemented policies with the aim to reduce and control migration showed marginal effects and rather transformed instead of stopped migration (Van Mol & de Valk, 2016). Reasons for increasing foreign residents are the change in European migration systems from circular (i.e. temporary guest workers) to chain migration (i.e. family reunification) as well as the related natural growth of migrant populations. Moreover, many non-European migrants who arrived under labour recruitment started to settle permanently since returning to their home countries significantly increased the risk of losing their resident permit. Even though governments tried to inhibit family reunification, they had little to no success since it was considered a fundamental right under Art. 10 of the European Social Charter of 1961 (Van Mol & de Valk, 2016).

Migration quickly became an important topic in national politics and public debates. Moreover, the ongoing economic recession and increasing unemployment levels "fuelled hostility, racism, and xenophobia towards certain "visible" groups of resident migrants" (Van Mol & de Valk, 2016). Populism and support of right-wing parties gained momentum. The French *Front National* for example gained vast popularity with their simple but xenophobic slogan "2 million unemployed = 2 million immigrants too many". This resulted in increased awareness towards migration and the public started to realise that the majority of the migrant population is meant to stay. Hence, the need for adequate integration policies became prevalent and they slowly started to develop (Van Mol & de Valk, 2016).

This period in time was also characterised by a considerable increase of asylum applications. *Figure 1* illustrates the increase of annual asylum applications in the EU-15 between 1970 and the end of the 20th century.

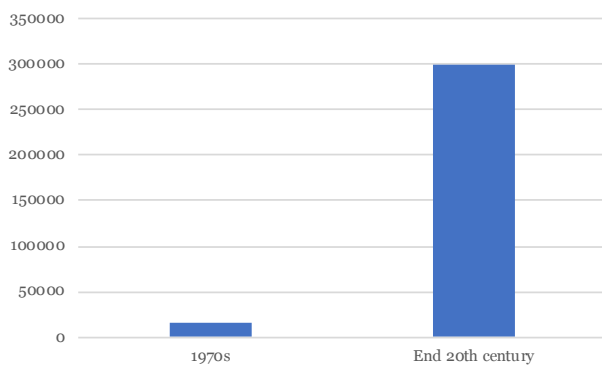


Figure 1 Annual Asylum Applications EU-15 (Own figure according to Hatton, Richter & Faini, 2004)

The aforementioned restrictions in North-Western Europe (i.e. migration stop) combined with economic growth and declining fertility rates (i.e. labour shortages) in Southern Europe increasingly diverted migration flows towards this direction. However, since countries such as Italy, Greece, Spain and Portugal were mainly emigration countries in the past they did not dispose over the necessary immigration legislation and control systems (Van Mol & de Valk, 2016). Not only was Southern Europe becoming increasingly attractive for people from North Africa, parts of Asia and Latin America, but they also experienced considerable return migration from people who earlier migrated to North-Western Europe under labour recruitment schemes.

Migration from, towards and within Europe further diversified in the 1990s. The collapse of the Iron Curtain and the subsequent opening of Eastern European borders combined with the Yugoslavian war triggered new migration flows across Europe. In the first few years of the 21st century asylum applications in the EU-15 considerably decreased to as low as 180,000 applications in 2006. Thereafter, numbers increased again due to ongoing conflicts in Afghanistan, Iraq and more recently the Arab Spring, which is seen as the main underlying factor of the Mediterranean migration crisis (Van Mol & de Valk, 2016).

Recent Trends – The number of mobile EU citizens and non-European migrants has increased considerably since the beginning of the 21st century. As indicated by Figure 2, this number has

grown by roughly 60% from 34 million around Millennium to 57 million in 2017.

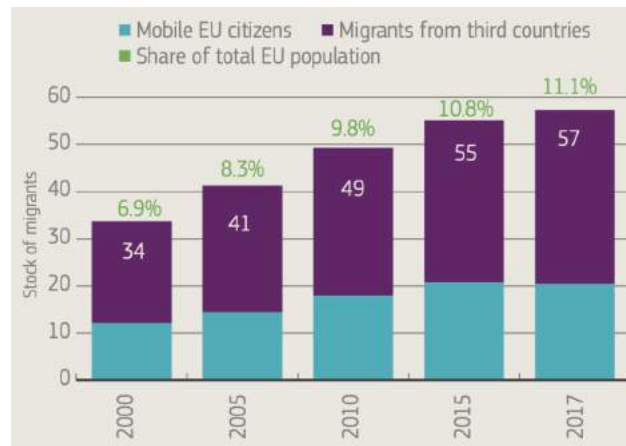


Figure 2 Number of non-European Migrants and mobile EU Citizens (ESPAS, 2018)

Still, there are European countries that experience positive net emigration. Between 2010 and 2016 Spain, Poland, Romania and Greece faced net migration losses which reduced pressure on local labour markets but inevitably caused brain drain.

Intra-EU labour mobility, which was facilitated by the Freedom of Movement established in the Treaty of Maastricht in 1992, gained further momentum with the EU enlargement to Central and South-Eastern European countries in 2004, 2007 and 2013 respectively. The last financial crisis and the subsequent increase in unemployment levels incentivised people from Italy, Spain or Portugal to move within the EU in search of job opportunities. Between 2010 and 2015 an annual average of 1.1 million EU citizens moved to other EU countries mainly seeking labour or education (ESPAS, 2018).

Europe's Migration Crisis and its Political Impact – The recent spikes in irregular migration observed between 2014 and 2016 have changed circumstances once again. The so-called migration crisis escalated quickly and the EU found itself opposed to the deepest political and social crises in history. The main reason for such an abrupt rise of asylum applications are tensions in North Africa and Middle East (i.e. Arab Spring). With an excess of over one million migrants arriving in the EU, the migration crisis peaked in 2015 and subsequently created an urgent need for adequate measures in order to manage this massive influx and potential negative side effects. Figure 3 illustrates the sudden increase of asylum seekers entering the EU with its peak in 2015 and provides evidence that labour migration negatively correlated with the increasing number of asylum seekers during this time.

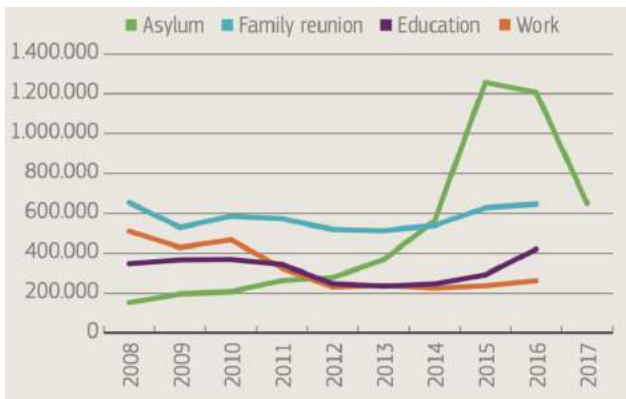


Figure 3 Peak of the Mediterranean Migrant Crisis in 2015 (ESPAS, 2018)

The EU certainly had enough resources and capabilities to adequately handle this social phenomenon if all Member States had shown equal solidarity and motivation to find a mutual solution. However, this was clearly not the case and the EU found itself deeply divided in on-going political debates (Borowicz, 2017).

Retrospectively, the EU adopted the Common Basic Principles for Immigrant Integration Policy in 2004, which is ought to set out a common integration approach in the EU. Hence, the successful integration of 3rd country nationals into an integrated Union without internal borders (i.e. the Schengen Area) should be of equal interest to all EU Member States. The importance of integration became particularly evident with the start of the refugee crisis late 2014 and clear political signals from the EU emerged. By proposing the EU Agenda on Migration in May 2015, the EU recognised “migration both as an opportunity and challenge for the EU” (Kancs & Lecca, 2017). The policy defines medium to long-term priorities with the aim to support EU Member States to tackle migration challenges in order to overcome crises and to capitalise on opportunities (Kancs & Lecca, 2017). The Agenda covers “four pillars: 1) reducing the incentives for irregular migration; 2) saving lives and securing external borders; 3) strengthening the common asylum policy; 4) developing a new policy on the legal migration” (Kancs & Lecca, 2017).

Regarding the aforementioned opportunities, Europe faces a demographic shift in terms of ageing societies and many Member States are confronted with shrinking population and labour force (Borowicz, 2017). Thus, coherent integration policies based on solidarity among the Member States could turn out to be beneficial in terms of economic and social impact in the medium- to long-run. Figure 4 projects the decline of Europe’s population and labour force in the absence of migration. Furthermore, it clearly shows to what extent the economic prosperity of the

European continent depends on migration. Thus, successful integration policies could help the EU to overcome the generation gap and positively contribute to tax revenue (Borowicz, 2017).

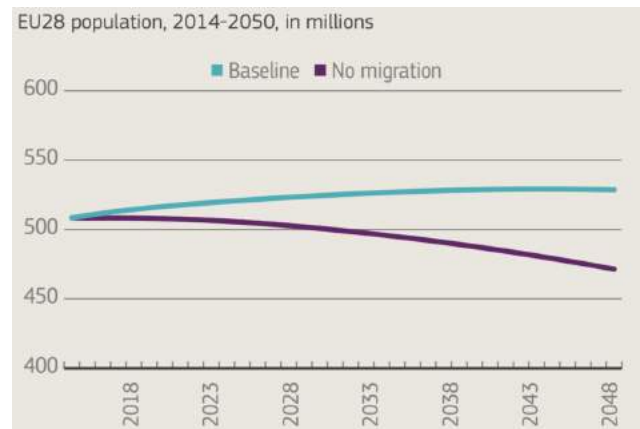


Figure 4 Projection of the EU Population and Labour Force in the Absence of Migration (ESPAS, 2018)

So far the EU acts “in line with the fundamental rule of integration, namely “global responsibility”, which imposes upon the Member States joint responsibility as part of the international community” (Borowicz, 2017). Two mechanisms were proposed by the EU in order to deal with the high number of asylum seekers: the Union Resettlement Programme and the Relocation System. Both programmes aim at solving the issue of disproportionate inflow of migrants into selected EU Member States (Borowicz, 2017). The fact that only a handful of European countries (i.e. Germany, France, the Netherlands, Malta and Finland) have respected the EU Council’s decision in September 2015 to reallocate a total of 160,000 asylum seekers among EU Member States provides evidence that the notion of solidarity towards the high influx of migrants via the Mediterranean is interpreted differently among Member States. Countries such as Poland, Hungary or Austria have shown a rather disappointing attitude by refusing to become actively involved (Borowicz, 2017).

Rise of Populism – Another relevant issue when discussing the political implications of the migration crisis is the rise of populism that correlates positively with the high number of asylum seekers. Fear and uncertainty induced by migration is often publicly leveraged and turned into a political weapon in order to boost and support populist parties (Borowicz, 2017).

While in North and Central Europe a rise of right wing populist parties is observed there is an increase of left wing populist parties in Southern Europe. Both right and left wing populists support nationalism and are anti-elitist in certain ways. While the right wing has a strong sense for

nativism (i.e. blood and soil ideologies), being very conservative and authoritarianist, left wing populists rather use classic left motives (i.e. class struggles, contra globalisation and anti-capitalism) and their definition of nationalism is not in a nativist or ethnic sense, such as the right wing, but rather in a civic and inclusive way (Harris, 2018). Rising populism is not a new phenomenon and today anti-immigrant stands against migrants from North Africa and the Middle East can be compared to the rise in populism after the fall of the Iron Curtain. Soon after the Austrian Freedom Party or the French Front National for instance gained momentum by opposing migrant flows from former Eastern European communist countries. However, migration is not the sole reason for the recent increase of populism in Europe. Furthermore, the financial crisis by which Southern Europe was heavily hit, was another driving force. A rise in populism was also observed in Western and Central Europe (i.e. Austria, Switzerland, Scandinavian countries) but rather out of fear of recession. Consequently, populism intensified in order to protect their welfare and to hamper migration which is usually negatively perceived during economic slowdown (Harris, 2018). In Eastern European countries (i.e. Poland and Hungary) the recent migrant crisis drastically enforced right wing populist parties. Growing antisemitism and policies that endanger democracy in various aspects (i.e. freedom of media and opinion) which get publicly legitimised are only some of its negative consequences. This dangerous development is highly controversial considering the fact that the number of migrants in those countries is almost inexistent and they refused to participate in the aforementioned reallocation scheme (Harris, 2018).

Conclusion and Potential Future Scenarios – Europe has been confronted with migration for several decades and has experienced rise in populism because of increasing cultural and security concerns. However, policy makers should rather invest in coherent integration policies and sensible relocation schemes than polarising and feeding on anti-migrant sentiment. Otherwise the political balance within Europe will quickly shift which could negatively affect liberal democracy.

The future of migration in and into Europe depends on various factors. From a political point of view, it is highly dependent on “future admission policies as well as the degree of selectivity and openness/restrictiveness in migration policies applied by receiving EU countries” (ESPAS, 2018). Moreover, successful integration policies are key in order to deal with the high number of migrants and to further capitalise on the various

potential benefits. Regarding the future outlook three potential scenarios are briefly introduced:

Scenario 1 – Increased political instability in neighbouring countries (i.e. in the Middle East, North Africa or parts of Asia) or extreme weather conditions around the world could lead to massive flows of migrants into Europe in need of protection. Subsequently this might cause further discrimination and intensified populism as currently observed (ESPAS, 2018).

Scenario 2 – A more selective admission criteria for migrants based on skills and education could be another tendency. Major migration policy changes were needed to shift from humanitarian to merely skill-based admission criteria. Such a change might trigger more restrictive policies with regard to non-economic migrants. This scenario could potentially maximise economic prosperity and simultaneously “reduce integration challenges as more future EU residents are selected taking into account their skills and/or available jobs” (ESPAS, 2018).

Scenario 3 – Furthermore, it is conceivable that migration policies become more restrictive due to an increase in public scepticism towards migrants. Hence, it would cause a shift in social climate against foreigners which would ultimately reduce Intra-EU mobility, migration as a whole and even cause higher return rates. The main challenge of this scenario was the management of the demographic ageing, decline in population and shortage of labour and skills (ESPAS, 2018).

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Migration in and into Europe: Societal, political and economic impact in the past and in the future till 2030

Submitted by Katharina Honsberg

The development of Europe has always been determined by migration since the beginning of mankind. While migration can help Europe to lessen problems that the continent will face in the future, migration can also cause integration challenges and initiate political debate about its outcomes. As recent migration inflows have become a critical topic among natives, it is important to shine light on the possible impacts of migrations. Therefore, we looked at migration in and into Europe and examined its societal, political, and economic impact in the past and the future till 2030. In particular, I emphasize the economic effects of migration in this paper.

Migration in the Past

We classified three main migration periods based on several literature findings: migration from WWII to the oil crisis (1973), migration from the oil crisis (1973) to the fall of the Iron Curtain (1990), migration from the fall of the Iron Curtain (1990) to the recent migration inflows (around 2012) (Kaya, 2002; Van Mol & De Valk, 2016). In the first period, economic migration paths from South to North-West-Europe prevailed as the economies of industrial advanced North-West-European countries were booming and economic discrepancies in South-Europe increased. The lack of labor supply for reconstruction and industrial production led countries in North-Western Europe to actively recruit foreign labor as many working-aged people were killed during the war (Van Mol & De Valk, 2016). Additional economic migration resulted from the process of decolonization. Migrants returned to their home or migrated to their mother country in Europe. Even though the majority of immigrants were legally considered citizens of their mother countries, they faced discrimination, poverty and social exclusion as integration gaps started to form (Kaya, 2002). Furthermore, migration flows resulted from the east-west gap as more people fled their communistic home country to escape human violations and economic poverty (Kaya, 2002). Even though communistic countries viewed migration as their labor force being stolen, migration was generally perceived as valuable due to the favorable economic outcomes for both the home and host country (Bonifazi, 2008; Van Mol & De Valk, 2016). Even home countries viewed emigration as supportive as it eased pressure on the labor market in times of high unemployment and low wages (Page Moch, 2003). For instance,

Turkey even saw destabilization effects of their economies when emigration ended (Barou, 2006).

The second migration period lasted from the oil crisis in 1973 to the fall of the Iron Curtain in 1990. This period started to see shifts in migration flows in regards of home and destination countries. While North-West Europe started to control and tried to put a hold on immigration as economic growth declined (Castles et al., 2014), the quality of life in South-Europe eventually started to improve. As a result, many migrants returned to their home countries in South-Europe following increased labor demand and former emigration countries in South-Europe became immigration countries (Barou, 2006). Meanwhile, West-Europe faced growing tensions which were incited by foreign hostility and racial strains (Van Mol & De Valk, 2016). As economic conditions in North African countries and Turkey diminished, more non-European migrants started to immigrate into Europe (Van Mol & De Valk, 2016).

The third migration period lasted from the fall of the Iron Curtain in 1990 to 2012 shortly before current migration flows peaked. During this period, Europe saw an increase in the diversity of migrants and humanitarian migration became more influential as refugees outnumbered labor migrants as seen in figure 1 (European Strategy and Policy Analysis System, 2018). The opening of East-European borders, the fall of the Iron Curtain and ethnic cleansing wars in former Yugoslavia let east-west migration from Yugoslavia, Iraq, and Turkey rise drastically. In 1992, the signing of the Treaty of Maastricht initiated further steps towards a unified Europe. As a result, increased Intra-EU mobility impacted Europe's economies positively because it fostered a better matching of labor supply and demand within its member states. Intra-EU mobility was generally seen as beneficial; experts often claim that Intra-EU mobility makes the EU vital and competitive (Van Mol & De Valk, 2016). Furthermore, European Member States started to attract highly-skilled students and labor from all over the world. Several incentive programs like the EU Card Scheme were introduced, a EU work permit to encourage highly skilled labor to move (Eurostat 2011).

In contrast, Europe increased its impact and control of migration of non-EU-citizens from third

countries. The unification led to active border controls and stricter immigration laws for non-EU-citizens. By the end of the century, asylum applications had officially declined. However, stricter immigration laws also led to illegal immigration into Europe (Bonifazi, 2008; Castles et al., 2014). Due to economic hardship during the financial crisis, many migrants from South-Europe began migrating towards North-West-Europe. Countries such as Spain, Italy, and Greece became emigrating countries again. Rising tensions and war conflicts in the Middle East in 2006 as well as the Arab Spring in North-Africa in 2010 steadily increased the numbers of humanitarian and rights-based migration which paved the way of the recently occurring migration waves. Most of the asylum applications were submitted in North-West-European countries such as Germany and Sweden (Castles et al., 2014).

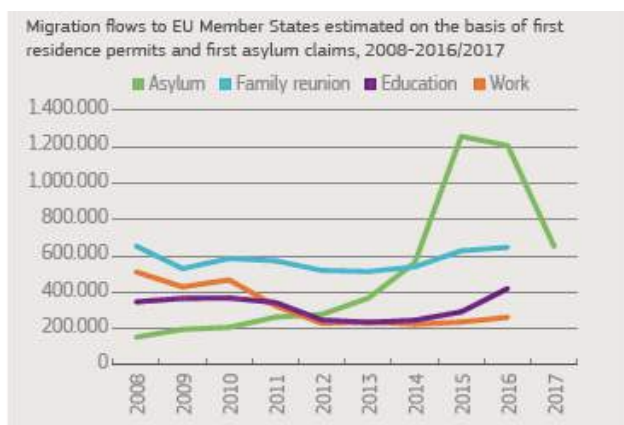


Figure 1. Labor migration to EU drops as asylum-seekers peak.

Source: Eurostat. Reprinted from “Global Trends to 2030: The Future of Migration and Integration” by European Strategy and Policy Analysis System, 2018, ESPAS Ideas Paper Series, p. 3.

Present Migration and its Future Economic Implications

To begin with, migration creates two major economic shocks. First, inflows of migrants generate a labor supply shock because of the sheer amount of migrants that enter the labor market. Second, migration inflows lead to an overall demand shock because of the initial public expenditure for new-coming migrants such as housing, health care, food, and education (IMF, 2016).

In the short term, migration leads to a modest economic growth. In 2016, the GDP above baseline shows an average increase between 0.1 and 0.2%. This small but positive growth, however, is mostly attributed to the additional public

spending on new arrivals to provide them with initial support. At this time, the labor supply shock can only be partially taken into account as a multiplier on growth because of the time required for migrants to enter the labor market. For example, asylum seekers are not allowed to enter the labor market until their application is accepted. The approval takes up to 1 year varying from one EU Member States to another. During this time, asylum seekers rely on governmental support (IMF, 2016). Simulations with different levels of public integration support show that each scenario – whether the support level is high or low – the short-term dynamics are similar. Moreover, increases in overall demand usually leads to a rise in investments, which can also have stimulating effects on economic growth (Kancs & Lecca, 2017).

Long-term economic effects depend on if and how fast migrants can be integrated on the labor market. For instance, when asylum seekers enter Europe, they accumulate a negative net fiscal impact in the beginning – differences between taxes paid and welfare benefits received. From an economic point of view, they should immediately enter the labor market to contribute to their net fiscal impact. In other words, the faster migrants enter the labor market the faster they create sustainable economic growth (IMF, 2016). With this in mind, the current challenges of integrating refugees on the labor market may indicate that initial investment in integration should be higher than they are now to accelerate labor market entries and maximize economic benefits. When integration support reaches the level migrants need in order to meet natives’ occupational and language skills, the economic growth is estimated to reach 1.31% above baseline in the future compared to 0.15% for current integration support as seen in figure 2 (Kancs & Lecca, 2017).

Of course, the integration costs will outweigh the economic benefits in the beginning as the net fiscal impact is negative. However, it is important to notice that the break-even point will be reached much sooner the higher the initial integration investments are. In general, it is expected that the earliest break-even points will be reached after 8 to 9 years. The expansion of GDP in later periods is then the result of migrants gradually entering the labor market, therefore increasing the supply of labor. Once integrated in the labor market, migrants can fill vacancies, put tensions on wages and reduce commodity prices. Ultimately, competitiveness rises leading to multiplier effects on economic growth (Jaumotte, Koloskova, & Saxena, 2016; Kancs & Lecca, 2017).

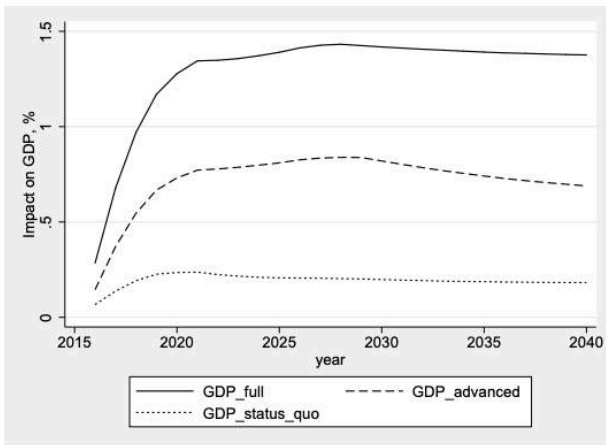


Figure 2: Simulated impact on the GDP under three alternative refugee integration scenarios, deviations from baseline in percent

Source: “Long-term Social, Economic and Fiscal Effects of Immigration into the EU: The Role of the Integration Policy” by Kancs, A., Lecca, P., 2017, JRC Technical Reports, p.20.

There are several factors and different characteristics of migrants that decelerate the pace of labor market entry. Asylum seekers migrate in and into Europe of hopes to find safety. On the other hand, labor migrants chose their target country in order to maximize their occupational outcomes. Hence, it is easier for labor migrants to seek employment. In fact, already accepted employment offers usually are be the trigger to migrate in the first place. Having mentioned that, the cause of migration – whether migrants are refugees that flee humanitarian crisis and war, labor migrants that move to accept new employment, or economic migrants escaping economic poverty - plays an important role for integration. In addition, as recent refugees mainly came from the Middle East to Europe, their mother tongue represents another factor that may hinder fast integration as Arabic shows distinct differences to most European languages. The skill level of migrants is an important characteristic as well (IMF, 2016). The higher the complementarity of migrants’ skills to the natives’ skills, the easier it is for migrants to seek employment. On the other hand, a high substitutability can have negative impacts on the native population as it can increase unemployment rates among the native population and reduce wages (Ottaviano and Peri, 2012). Some low-and high-skilled migrants may face additional challenges as barriers such as market rigidities and welfare traps present themselves. Even though Europe desires to attract highly-skilled labor, highly-skilled migrants remain overrepresented in low-skilled jobs as their educational achievements are not

recognized and barriers to better qualified jobs are high. Other barriers for maximized economic outcomes include restricted mobility and the stage of the business cycle that the respected economy is in. While the effective matching of labor demand and labor supply is hindered due to restricted mobility, an overall plunging economy puts pressure on unemployment rates which in turn widens labor entry barriers (IMF, 2016). Empirical evidence has shown that the initial integration gap on the labor market between migrants and the native population is quite distinct, but as migrants improve their occupational and language skills it diminishes over time. In general, migrants from advanced economies or with better fitting language skills are more easily integrated on the labor market than refugees and female migrants. Figure 3 clearly shows these labor market integration gaps between different groups of the population. Shockingly, it shows that it takes up to 20 years for the labor market participation rate to be as high as the native populations. Such wide gaps also picture that it is more likely for migrants to fall into poverty (European Strategy and Policy Analysis System, 2018).

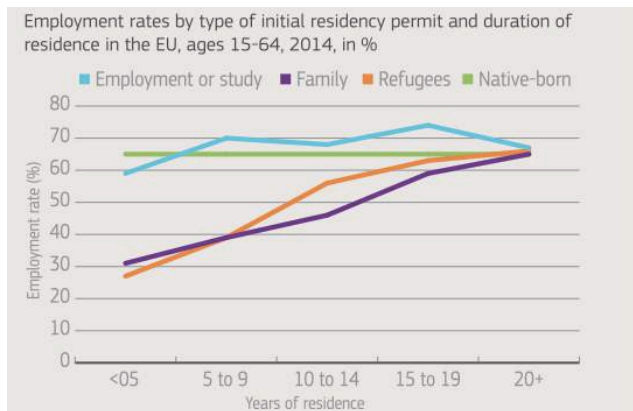


Figure 3. Refugees and dependent family members are not easily integrating into labor markets

Source: OECD, EU-LFS 2014 ad-hoc module. Reprinted from “Global Trends to 2030: The Future of Migration and Integration” by European Strategy and Policy Analysis System, 2018, ESPAS Ideas Paper Series, p. 6.

For the future, changes in policies could leverage the integration of migrants on the labor market. Policies could minimize the restrictions on work and mobility of asylum seekers during their application process. As a result, labor supply can meet demand more rapidly. Active labor market policies (ALMP) could be strengthened for migrants especially for refugees. In particular, subsidies could be paid to private employees of

migrants and counselling as well as tailored introductory programs could be introduced so that migrant can improve their occupational and language skills. Additionally, migrants could get easier access to self-employment, which includes easier access to credits but also basic financial services such as creating a bank account. Lastly, policies could prevent inactivity or welfare traps so that work is valued more than the transfer of welfare (IMF, 2016).

As more migrants enter the labor market, many natives express concerns for their employment. Empirical data has shown that these concerns among natives are limited and only temporary. These interdependences exist, however, the possible descending tension on wages and inflation when migrants enter the labor market are most likely compensated quickly with fiscal expansion and the support of monetary policy (IMF, 2016). Migration has been reported to increase employment rates among natives as well (Furlanetto & Robstad, 2017).

Migration also has valuable but rather small effects on demographic aging. Several studies have looked at different migration and non-migration scenarios in Europe and how they impact the population. For instance, as seen in figure 4, inflows of migration will slightly intercept the decline of inhabitants in Europe. However, even when current migration inflows remain, migration is not able to stabilize the downturn in Europe's population (European Strategy and Policy Analysis System, 2018).

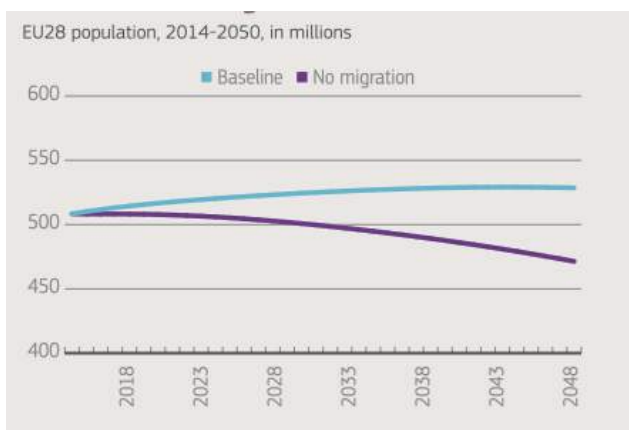


Figure 4: EU Population and Labor Force to shrink without Migration

Source: *Europop, Eurostat*. Reprinted from "Global Trends to 2030: The Future of Migration and Integration" by European Strategy and Policy Analysis System, 2018, ESPAS Ideas Paper Series, p. 4.

Future Migration and its Economic Implications

We believe that the scarcity of labor migration with high competences in the future may lead to changes in Europe's migration policies. In times of globalization, when skills and competencies generate competitive advantages, the attraction and retention of advanced educated migrants is relevant to avoid falling of the global bandwagon. This trend of increased demand for highly-skilled labor is expected to continue in the future (figure 5). Compared to other parts of the world, Europe (EU-15¹) has been reported to lack behind a whole 20% in attracting highly-skilled foreign labor compared to other regions in the world as seen in figure 6 (European Strategy and Policy Analysis System, 2018).

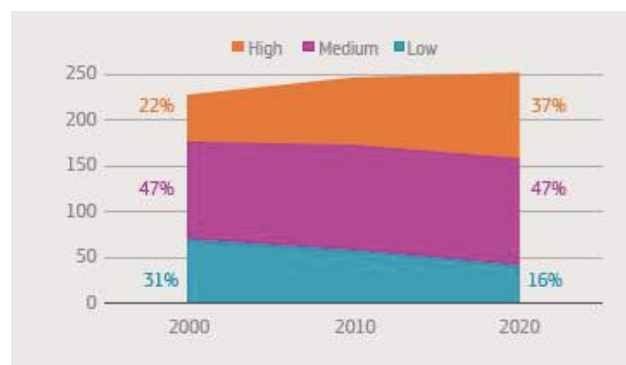


Figure 5: Labor force by level of qualification in the European Union

Source: *European Center for the Development of Vocational Training*. Reprinted from "Global Trends to 2030: The Future of Migration and Integration" by European Strategy and Policy Analysis System, 2018, ESPAS Ideas Paper Series, p. 5.

In order to counteract this development, Europe may shift their migration policies to become more selective. Instead of focusing their selection on humanitarian criteria, Europe may shift their attention to more restricted ability - based labor migration similar to countries such as Canada and Australia or to employment - driven admission like Sweden and New Zealand. This political shift, however, might come along with tighter regulations for economic or humanitarian migrants. From the economic point of view, such selective admission criteria may help maximize economic growth and diminish integration gaps of future migrants as the vacancies of employment offers are considered (European Strategy and Policy Analysis System, 2018).

¹ EU Member States that joined until 1995

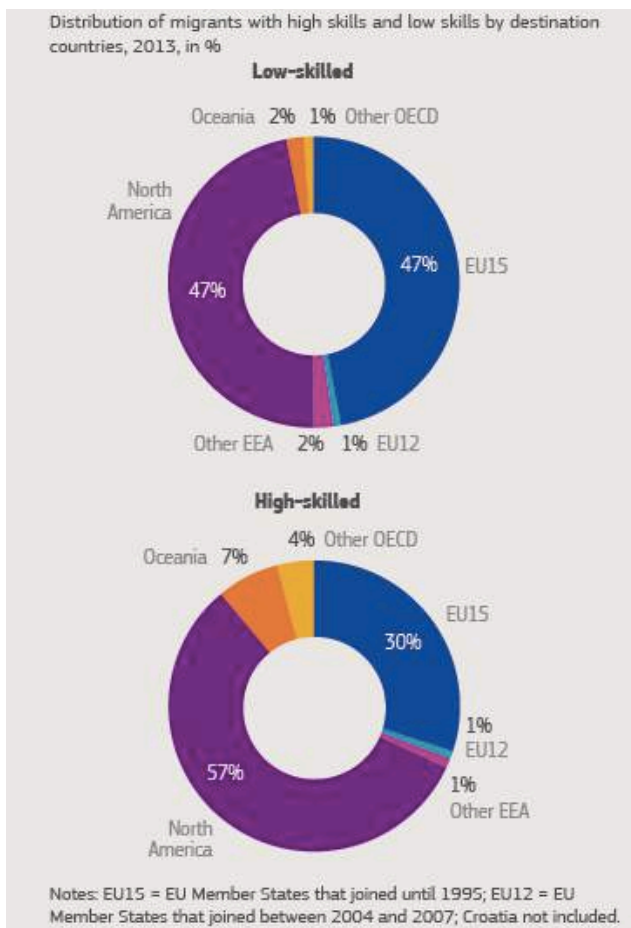


Figure 6: Europe underachieves in the global competition for high talent

Source: Organisation for Economic Cooperation and Development (OECD). Reprinted from "Global Trends to 2030: The Future of Migration and Integration" by European Strategy and Policy Analysis System, 2018, ESPAS Ideas Paper Series, p. 6.

In conclusion, migration generally impacts the economies of their destination countries in Europe positively. In the past, migration has even been seen as economically necessary for both the host and home country. Having said that, the range of beneficial outcomes depend strongly on the pace that the migrants enter the labor market. Nowadays integration gaps still prevail and natives gradually begin to produce misconceptions about migration. To improve the situation, it is important to acknowledge external factors and characteristics of migrants that can present obstacles and induce changes in policies to help fasten integration. In the future, economic outcomes in Europe could be increased as the selection of migrants increase, but as migration is a very complex topic all aspects of it on society, politics and economics must be considered to pave a successful way.

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Societal impacts on migration in and into Europe in the past and in the future

Submitted by Erika Pagacz

Migration is a highly current topic in Europe due to the present refugee crisis. However, the continent has been facing different forms of people movements for a substantial period of time with a high increase in the period post to the second world war. Yet, a settlement of people from different cultures and socio-economic backgrounds causes societal impacts for both the inhabitants in the host countries as well as for the migrants. This management summary focuses on the integration process which is considered necessary for a social acceptance and provides a key factor crucial to attain a successful integration. Moreover, it does also provide an outlook of the complex characteristics of future people movements.

The migration of guest workers

Due to the economic boom in the North-Western Europe during the years after the second world war, migration within Europe increased as a result of vacancies within the field of unhealthy and poorly paid jobs. This was a result of an increased level of education which enabled local workers in the booming countries to transfer to white-collar work and thus created a migration flow from underdeveloped or developing countries. However, as the recruited foreign workers, mainly male and unskilled, were expected to return home after finishing labour, they were granted limited rights and little or no welfare support (De Valk & Van Mol, 2016). Yet, as employers had invested in recruiting and training, they became the strongest supporters of the guest workers. Moreover, the stay in the North-Western Europe secured the lives of the foreign laborers as they received a steady and higher income than they would receive at home due to limited job opportunities prevalent in their countries. Yet, the migration was not only intra-European. Due to the decolonization, migration increased from former colonies as well as from Turkey and northern Africa as a result of further demand for workers. Even though the workers were only supposed to stay to complete the labour, they were eventually allowed to stay longer as well as to bring their families, resulting in a change from circular to chain migration (Prevezanos, 2011).

Furthermore, as long as the economy was thriving, guest workers were accepted and not considered a problem. Yet, as a consequence of the oil crisis and thus the economic downturn in Europe, the need for labour was sharply reduced. This further resulted in guest workers becoming

scapegoats for unemployed nationals (Mihajlovic, 1987). Moreover, a general negative view on migrants emerged, characterized by hostility, xenophobia and racism. According to a survey conducted in 1980, the main factor that determines the attitude towards guest workers is education. Yet, it can further be stated that the implementation of the guest worker programme had caused a negative selection of migrants as only labour from the poorest and most rural regions, whose socio-economic background and education were limited, were recruited (Dronkers, de Heus, 2009).

Furthermore, as western countries did not integrate migrants as equals but rather as economically disadvantaged and ethnically discriminated minorities, migrants settled in neighbourhoods characterized by worse living standards. Additionally, special ethnic associations and religious organizations arose in these areas. However, the lack of integration was not only due to external factors. As guest workers originally came to earn money and return home, far from everyone had an incentive to integrate, which was especially true for non-European migrants. Yet, economic aspects and chain migration resulted in their staying but the attitude remained the same (Elger, Kneip & Theile 2009). Moreover, this had a vast impact on the second generation of guest workers as parents did not have a desire to estrange their children from their native culture. There was therefore often a reluctant attitude towards schools in the country of residence and these were further not prepared to take into consideration the different cultural aspects and languages. This has resulted in the second generation being less educated than their peers from the host country. It can also be stated that the lack of emphasize on education is also a partial result of the socio-economic background of the parents. Furthermore, as the children did often grow up in secular societies, they did therefore experience a lack of national and social belonging (Dronkers, de Heus, 2009).

Migration within the EU

As a result of the Maastricht Treaty in 1992, EU citizens are allowed a free mobility within the territory of the member states which has further resulted in increased movements between the countries. However, in contrast to the economic driven migration of guest workers, the decisions to move within the EU are driven by a plurality of

reasons. As some of the driving factors might indeed be the availability of higher wages and increased work opportunities abroad, movements within the membership states are also driven by non-work reasons such as retirement, family, education and lifestyle changes. Yet, even though the majority of the EU migrants are male just as the migrants after the second world war, these are often highly educated as opposed to the majority of the guest workers. However, the transition to attract high skilled people rather than low skilled workers has also expanded beyond the EU borders. There is thus a lower demand for low-skilled workers today due to the decreasing amount of low-skilled jobs as a result of the shift towards a knowledge economy. When it comes to further characteristics of intra-EU movements, it has been shown that the majority of the intra-union migration is aimed to metropolitan cities which thus makes these urban agglomerations the most multicultural areas on the continent. However, the EU has established a so called Blue Card Scheme, a permit for high-skilled non-EU citizens to work within the union. Furthermore, the EU countries have also actively recruited students with the aim to incorporate the most skilled ones in the domestic labour. Moreover, this can further be supported by the results of a survey, showing that Europeans, also nowadays, have a strong preference for high-skilled, professional migrants (Ford, Health & Richards, 2016 & De Valk & Van Mol, 2016).

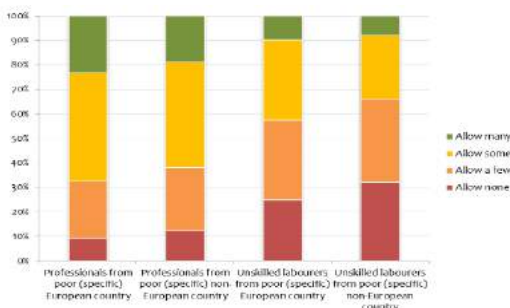


Figure 1: Attitudes towards immigrants. Ford, R., Health, A., & Richards, L. (2016). How do Europeans differ in their attitudes to immigration? Paper presented at the 3rd ESS conference, July 2016, in Lausanne, Switzerland.

As already pointed out, the main difference between today's intra-union movements and those during the 1960s is the level of education of the migrants, which previously was characterized by sub-stratification. One of the reasons is the increase in multinational corporations and high-skilled workers are therefore perceived as necessary flows of knowledge to the success of the companies. It can therefore be concluded that

this is a factor that facilitates integration as these migrants are not likely to end up in neighbourhoods with inferior life standards, creating a parallel society. It should, moreover, be emphasized that the mobility within the EU will most probably increase further in the near future as 25% of the EU citizens state that they might consider working in a foreign union country.

Today's refugee crisis

Since the start of the migration crisis in 2015, millions of people have been forced to move to Europe as to escape the war regions in the middle East. This is in contrast to the migration of guest workers as well as intra-EU movers whose migration can rather be viewed as voluntary. Moreover, the number of people on the move is the biggest since the second world war. In great contrast to the migration within the EU, the vast majority of the migrants do not have a higher education which constitutes a problem to entry the labour market, a core factor in the integration process which thus causes social exclusion and poverty. However, refugees that do indeed have a higher education often face difficulties in finding high-skilled jobs and do therefore end up with work below their level of education. Some reasons might be a lack of documents and diplomas as well as biases in hiring. These factors contribute to the fact that the poverty rate of immigrant households is much higher than among native households in the host country (Kancs & Lecca, 2017).

Moreover, another key fact to take into consideration when discussing the societal effects of the migration crisis is the uneven distribution of men and women. Data shows that 58% of the migrants were men whereas only 17% were women and the rest were children, an imbalance that might have serious effects. It has further been presented that women face a higher risk of being mistreated and are more susceptible to increased violence as a result of a disproportionate large amount of men (Symons-Brown, 2016). Furthermore, the integration of refugee women is particularly complicated and they take generally longer to get established on the labour market. This problem can be explained by the fact that refugee women do often come from countries with high gender inequality and an overall low employment of women. The women do therefore often lack competencies to apply for jobs. Moreover, data has shown that fertility usually peaks in the year after arrival as the process of the flight makes them more reluctant to have children during this time as well as due to the fact that there might be a waiting period for family reunification which might increase the desire to have children.

This is a factor that usually results in slower integration (OECD, n.d). It can thus be concluded that the situation of today's refugees is similar to the situation of the guest workers despite the vastly different reasons for migration. The similarity takes the form of a lack of integration and thus a lower level of social acceptance. Yet, there is one crucial difference that characterizes the migration present today from the other streams, namely the effect of religion. Studies have shown that Muslim immigrants face a higher degree of discrimination in the labour market and do also display a greater level of attachment to their home country than counterparts of other beliefs. It can thus be stated that today's migrants might face more difficulties to integrate as a result of Islamophobia and a strong identification with the home community. This results in a group of underemployed people who do not feel any connection to the country of immigration (Adida, Laitin & Valfort, n.d). Yet, a key thing to remember is that the perception of the term integration varies. Syrian refugees weigh integration as access to labour rather than in socio-cultural aspects which causes a clash between the migrants and the host inhabitants in regards to this phenomenon (Simsek, 2018).

Societal impacts in the future

The migration crisis that is prevalent today is a result of war and thus human actions. However, a migration of a considerable amount of people might further be due to climate changes in the future. The global warming is expected to drive people from countries that might experience great draught, such as Syria, towards Europe. This is the case as the draught results in decreased efficiency in agriculture. It can, however, be stated that adaptation to the climate change is possible, yet this is more probable to be the case in developed countries. This might therefore result in the fact that movements due to climate changes are most likely to occur from third world countries. Moreover, other effects of the climate change in third world countries might be a limited water supply as well as health issues which may cause migration flows.

However, negative climate changes might also result in the opposite scenario, that is people might get trapped in their areas as they become too poor to immigrate. Yet, migration can still be assumed and will probably result in similar societal consequences as the migration crisis now if further actions to prevent this are not taken. Furthermore, the time aspect should be taken into consideration as a new migration flow in the very near future might inflate the problems that already exist (Greshko, 2017 & Klepp, 2017).

However, to easier facilitate an integration, education is of a key value. As stated previously, people in the host countries are generally more tolerate towards people with high skills which therefore indicates that educating the migrants is of a great importance. It can further be stated that this will most likely result in a higher degree of integration due to the fact that the migrants will be able to enter the labour market quicker and to execute better paid jobs. The result will thus be a lower level of poverty in this group which therefore minimizes the risk of settling down in inferior areas remote from the population of the host country. Yet, what hinders integration is often the religious aspect, however, it might be speculated that this is less likely to be the case if the refugees are rather viewed in a positive light.

Moreover, a key aspect to consider is the climate change effects that will be prevalent within Europe. Due to the positive economic situation of the countries within the EU, the consequences of climate changes will impact the population to a less serious degree. Yet, as the temperatures will increase greatly in the southern and central parts of the continent, there might be incentives to move. However, as the mainly impacted will be the people working within agriculture, they might be the group that is most likely to emigrate, resulting in a change in the demographics of intra-EU migrants. This change is characterized by low-skilled people in contrast to the high-skilled individuals that dominate the movements today, which might further cause a worse perception regarding intra-EU movers.

Lastly, it is worth to point out that contemporary migrants do more often keep ties with their home country, something that will continue in the future due to factors such as improved technologies. This phenomenon, called transnationalism, implies that migrants remain in contact with their culture of origin. It can thus be stated that migrants do participate in social, familiar, religious and political processes in their home country at the same time as they become a part of the country of immigration. As transnational connections are made, there might be an increased amount of social and cultural exchange between countries in the form of, for instance, arts and music. Furthermore, there might also be economic impacts by, for example, trade and investment in special goods that might be sought by the migrants in the host countries. Moreover, transnational political and social awareness about the home countries is increased which can result in improved protection for human rights or raise funds to support what is happening in the home country. This is especially relevant regarding

migrants from war-areas and natural disasters. However, transnationalism is not spared from challenges that take the form of tradition withholding that is incompatible in the host countries such as gender roles. The phenomenon might thus be viewed as an unwillingness to integrate in the new society. Moreover, migrants may also be characterized by a loyalty split and might therefore be regarded as suspicious in the host country as well as in the country of origin which may sometimes result in increased national security concerns. Furthermore, it has been concluded that discrimination motivates migrants to keep even stronger bonds to the home country and it can be argued that this factor especially increases the challenging aspects of transnationalism as conservative tradition withholding might raise which hampers the integration. It can therefore be concluded that transnationalism generally enriches the societies as it facilitates an exchange of knowledge and cultural awareness, however it can also be viewed as destructive which further speaks for the importance of investments in education to facilitate faster integration. Moreover, it is not until this is established that the people in the host country can take advantage of the transnationalism that the migrants bring (IOM, 2010).

It can be concluded that migration has been an existing phenomenon in Europe during the entire period of the study, yet due to a plurality of reasons. However, the perception of these movements is highly different depending on the socio-economic background of the migrants, a factor that affects the speed of the integration process. It can further be stated that education might be considered a key to a success of migration and should therefore be highly emphasized due to the benefits that it brings from a societal perspective. Moreover, the current migration crisis is most probably not the end of movement flows towards the continent and the integration process is becoming more complex, something that has to be acknowledged to prevent adaptation issues.

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Investing in Africa: Compare the approaches of Chinese and European financiers in light of their ambitions and cultural background and perception of risk

Investment Strategies in Africa

Submitted by Laurin Binger

Africa has both great potential and many challenges. Two of the top five growing economies are African countries and the average annual GDP growth rate across African countries between 2005 and 2014 was more than 5%. Moreover, the continent as a whole has large quantities of different kinds of natural resources, including oil, copper, and gold. Also, African countries do not face the challenges related to an aging population as many western and eastern countries do. In contrast, the median age of 19.7 years in African countries in 2012 is well below the world median age of 30.4 years. Combined, these factors offer great potential for African countries.

However, the 54 nations of Africa also face pressing challenges. First, several African countries still show very low levels of development. In fact, 33 of the world's 48 least developed countries are located in Africa. 45-50% of the population in sub-Saharan countries still live below the poverty line meaning that they have less than 1.9 USD per day. Even worse, 36% of the population live on less than USD 1.25 per day.

Furthermore, Africa faces high birth rates leading to a substantial growth in population. Between today and 2050, the African population will almost double to 2.2 billion people. As a result, 800 million people will be looking for a job in 2050. Such a young work force can indeed be a blessing but can also pose many challenges, especially if there are high levels of youth unemployment. In addition to the demographic challenges, many African countries show conditions of instability. In fact, the world bank classifies 17 African states, which are home to more than 200 million people, as "fragile". Such states are an ideal breeding ground for political and economic instability and, as a result, for military conflicts and flight. Apart from that, Africa's richness in resources and the wealth generated from it does not benefit the entire population. Instead, wealth is unevenly distributed, and with it access to education, health care, running water, and sanitation. For instance, the population of the Democratic Republic of Congo, which has vast amounts of natural resources, still suffer from extreme poverty and violence.

In light of these challenges, it is essential for Africa to cooperate and trade with other countries. Two of the most important trading partners of African countries are China and the EU, accounting for 46% of Africa's exports. However, they follow distinct investment strategies based on their respective cultural background, perception of risk, major challenges, and ambitions.

EU and Africa

The relations between the European Union (EU), its member states and the continent of Africa have historic roots and has changed significantly over the last three centuries. Coming from a period of colonialism in the 19th and 20th century, the relations between the EU, its member states and Africa have shifted from a development aid-approach in the late 20th century to a partnership-approach based on mutual interests in the 21st century. Although the historic connections between the EU and Africa are partially perceived negatively, they also resulted in common languages, local knowledge, and a complex network of institutional, economic, and political relations between Africa and the EU. Hence, the historical connections still affect the investment strategy of the EU in Africa until today.

Looking at the EU, three different players that invest in Africa can be identified: the EU as a political entity, the member states of the EU, and private companies. Since the investment strategies in Africa of private companies largely depend on the company's profile, its industry, and strategy, the investment strategies observed in this sector significantly differ from each other. Similar results were found for the member states: their investment strategy greatly vary in scope and focus. In contrast, the EU follows an investment strategy that can be perceived as a common effort of its member states. Therefore, the analysis in this paper focuses on the investment strategy of the EU.

The current investment strategy of the EU in Africa is mainly influenced by four elements: the cultural background, perception of risk, major challenges, and ambitions of the EU. These elements can be characterized adequately as a result of a PESTEL-analysis of the EU:

Although cultures across the member states of the EU differ, they are all influenced by a conception of the individual which is shaped by human rights and individual freedom. This is also transferred to other peoples, states and nations outside of Europe which are treated with respect and dignity.

The risk perceived in the EU for investments in Africa can be characterized as relatively high, especially for investments in countries and cultures that do not share similar values in the fields of governance, rule of law and human rights.

Apart from that, the EU has to solve various challenges that arise from political instability, which is especially due to independence attempts of some member states, an aging population, climate change, limited natural resources, and migration.

Lastly, the EU has developed ambitions for its investment strategy in Africa which were communicated openly at the 5th EU-Africa Summit in 2017. The ambitions circle around four main elements:

1. Investing in people – education, science, technology, skill development
2. Strengthening resilience, peace, security, and governance
3. Mobilizing investments for African structural sustainable transformation
4. Migration and mobility

Investment strategy of EU

In order to support these ambitions, the EU has developed an investment strategy that is characterized by two main approaches: development aid and mobilizing additional finance. For each of these approaches, the EU has distinct funds and programs that vary in focus and volume.

Development aid

The EU has four programs and funds that are mostly characterized by elements typical for development aid:

First, *the Pan-African Program (PanAf)* supports projects with a trans-regional, continental or global added value with a budget of EUR 845 million. It focuses on five distinct areas including “peace and security”, “democracy, good governance and human rights”, “human development”, “sustainable and inclusive development and growth and continental integration”, as well as “global and cross-cutting issues”. Hence, it especially serves the first, second and fourth ambition of the EU.

Second, *the African Peace Facility (APF)* aims at fostering political stability, supporting effective governance and ensuring a peaceful and secure environment. To do so, short and long-term help is provided in order to avert and manage conflicts. For this purpose, funds of more than EUR 2.7 billion have been allocated by the EU. They are used, for instance, to cover logistical, medical and communication costs of troops. Consequently, the APF serves the second ambition of the EU.

Apart from that, *the Emergency Trust Fund for Africa* is designed to support efforts that aim at improving migration management and fostering stability. Specifically, projects that address forced displacement, irregular migration and destabilization as primary causes for migration are funded. For this purpose, the EU provides funds of EUR 4.1 billion that are mainly allocated to African countries that encompass key migration routes to European countries. Consequently, this fund is a result of the fourth ambition of the EU.

Lastly, the EU cooperates with *PALOP-TL*-states to support rule of law, democratization, human rights and economic governance in those states. It can be attributed to the second ambition of the EU’s investment strategy. The PALOP-TL states include five Portuguese speaking countries in Africa and one in the Caribbean (Angola, Cap Verde, Guinea Bissau, Mozambique, Sao Tome and Principe, Timor-Leste).

In consequence, it can be observed that development aid programs still play a major role in the investment strategy of the EU. Interestingly, for such programs, countries that adhere to the EU’s main values tend to be favored. Both observations can be explained by the European culture, which advocates human rights and individual freedom. These values seem to be dominant even in making investment decisions.

Mobilizing additional finance

The four programs that follow a development aid-approach are complemented by two funds and programs that focus on using financial resources to mobilize additional investments: the EU’s External Investment Strategy and the EU Infrastructure Trust Fund. Both result from the third and fourth ambition of the EU.

The EU Infrastructure Trust Fund aims at mobilizing finance for key infrastructure projects in sub-Saharan countries. Thus, access to energy, transportation, water supply, sanitation standards and communication services are improved. The total funds of EUR 812 million are used for direct investments, interest rate subsidies, and to

provide risk capital as well as technical assistance. With the funds used from 2007-2014, the EU Infrastructure Trust Fund could achieve a leverage effect of approximately 1:14, which correspond to additional investments of EUR 9.2 billion.

Similarly, the EU's External Investment Plan aims at mobilizing finance by systematically reducing risk, providing technical assistance and fostering a favorable investment climate. In doing so, the EU plans to use its financial resources of EUR 4.1 billion to leverage additional EUR 44 billion between 2017 and 2020. These investments are supposed to tackle the root causes of migration and improve economic and social development, in particular.

Consequently, both the EU Infrastructure Trust Fund and the EU's External Investment Plan aim at reducing risk for investments in Africa. This finding is especially relevant in light of the perception of risk in the EU which is relatively high for investments in Africa. With its investment strategy the EU actively addresses this issue by including appropriate programs.

China and Africa

The basis for the relation between Africa and China was established in the "five principles of peaceful co-existence" in Bandung in 1954. These principles include respect for territorial integrity, rejection of aggression, non-interference in internal affairs, equality and mutual benefit, and peaceful coexistence. These principles have shaped the relationship between Africa and China in the past and still influence the agreements between the two players to date. In 2012, the "Forum on China-Africa Cooperation" (FOCAC) defined its three pillars of cooperation as follows:

1. Non-interference in internal affairs
2. Strategic partnership
3. China is perceived as a developing country

Chinese investors can be divided into three groups: private companies, state-owned enterprises (SOE), and the Chinese state itself. This comparison focuses on the latter two, since they primarily act in the interests of the Chinese government and, hence, follow a relatively consistent investment strategy that can be compared to the strategy of the EU.

The investment strategy of the Chinese state and the SOEs is greatly influenced by China's cultural background, perception of risk, major challenges, and ambitions.

- The Chinese culture is shaped by three elements, among others: collectivism, hierarchies, and an orientation towards social status and materialism.
- Chinese investors have a greater risk tolerance than European investors. They tend to invest in politically unstable regions with less market competition.
- Major challenges that China faces include an aging population, resource shortages, environmental issues, increasing levels of debt and a weakening economy
- China's ambitions for its investment strategy has four main pillars: achieving energy and resource security, developing new trade partners, achieving structural change, and gaining political influence

Investment strategy of China

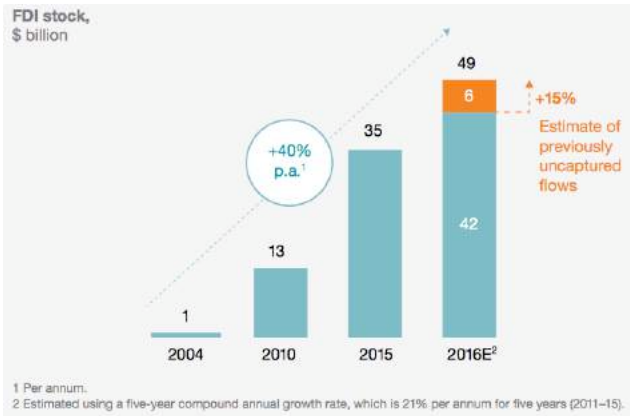
China's investment strategy in Africa has two main pillars: development aid and development finance.

Development aid

The measures taken to support development aid especially include grants, interest-free loans, and preferential loans. These elements are characterized by a concession element and can therefore be allocated to the pillar of development aid. This pillar represents a relatively small part of the overall cooperation.

Development finance

This pillar mainly consists of programs and measures that do not show sufficient development objectives such as commercial loans and direct investments. Rather, they are used to foster economic interests and mostly serve to achieve three of the four ambitions that characterize the Chinese investment strategy: achieving energy and resource security, gaining political influence, and achieving structural change. Having grown significantly over the past years, this pillar represents the main part of China's investment strategy in Africa. For instance, China's foreign direct investment stock in African countries has grown from nearly zero to almost USD 50 billion between 2004 and 2016 according to a study conducted by McKinsey&Company.



Graph 1: Chinese FDI stock in Africa in USD billion (Source: Jayaram, Kassiri & Sun Yuan, 2017)

To conclude, the Chinese investment strategy strongly focuses on economic cooperation. The Chinese government mainly uses SOEs to offer complete solutions to the African countries independent of their political system or level of good governance. In case the African country lacks financial resources to cover China's project expenses, unconventional approaches to secure the Chinese investments are applied. For instance, China uses commodity-backed loans to ensure financing for its projects in countries with low credit ratings, also known as the "Angola Model". Thus, China tackles some of its own challenges, especially its lack of natural resources. Combining these elements of China's investment strategy with the "non-interference" policy of the partnership between China and Africa, China is likely to continue to increase its economic and political impact on Africa.

A comparison

The investment strategies of China and the EU in Africa greatly differ from each other. While the Chinese investment strategy focuses on economic cooperation, the EU combines economic and political elements. Consequently, the EU tends to favor countries for its investments that share or are committed to pursuing similar values, including basic human rights and good governance. In contrast, China strategy is characterized by a non-interference policy that allows China to invest even in politically unstable states with less responsible governance, such as Zimbabwe. In fact, there is a positive correlation between political instability and the level of FDI of China.

Furthermore, both investment strategies differ regarding their main focus. On the one hand, China focuses on development financing and uses unconventional models to secure its investments, i.e. "Angola Model". On the other hand, the EU still maintains strong development aid programs and only gradually shift to other investment

approaches. Such new investment approaches mainly focus on using funds in order to mobilize additional investments.

These differences in investment strategies can be explained by the cultural background, perception of risk, challenges, and ambitions of China and the EU. Based on a PESTEL-analysis, it can be stated that the characteristics of all four elements differ between China and the EU. Since they greatly influence the respective investment strategies, they can be identified as a root cause for the observed differences.

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Investment Strategies in Africa

Submitted by Patrik Seyfried

33 of the world's 48 least developed countries are located in Africa. Consequently, it does not come as a surprise that Africa faces many challenges. Starting with a substantial increase in population, due to a high birth rate and consequently a high proportion of women of childbearing potential. As a result, the population will increase to about 2.2 billion by 2050. By 2100, it is estimated that 4.4 billion people will live on the continent. As a result, 800 million people will be looking for a job by 2050. Such a young work force can indeed be a blessing but can also pose many challenges, especially if it leads to an increase rates of youth unemployment.

According to the OECD, 17 of the 55 African countries are medium to highly developed, and they are growing rapidly, as in the case of Ethiopia (240% increase in income between 2000 and 2015). By contrast, the world bank classifies 17 African states, which are home to more than 200 million people, as "fragile". Whereas in East Africa, based on a strong innovation and entrepreneurship landscape, economic growth of 5.9 – 6.2% is predicted for 2018 and 2019, GDP in South Sudan decreases by 3.82%. Regarding the population growth, it can be seen that the poorer and more chaotic a country is the higher is population growth. In addition to the demographic problem, "fragile" states located especially in North Africa and the Sahel region are showing unstable conditions, which are an ideal breeding ground for political instability and, as a result, war, flight or terror.

Although several states have immense resources the population only benefit to a limited degree. Therefore, only a small part of the population has access to education, health care, sanitation and running water. For instance, in Nigeria, which has abundant resources, and increasing urbanization is the reason why thousands of people live in slums. Thus, it is not surprising that the average income per month is \$ 133 - despite resource wealth. In fact, 45-50% of the population in sub-Saharan countries still live below the poverty line meaning that they have less than 1.9 USD per day. 36% of the population (400 million people) live on less than 1.25 USD per day.

All of these challenges make it essential for Africa to engage in cooperation in different areas with other countries. Two of the most important trading partners are the European Union (EU)

and China. Concerning their investment strategy, the EU's approach differs substantially from the Chinese government's strategy, based on their respective cultural background, perception of risk, major challenges, and ambitions.

The European investment strategy

The cooperation between the European Union (EU), the Member States and Africa have developed over the last three decades from a development aid approach to a current partnership-strategy involving diverse interests and activities.

Regarding the question which actors in the framework of investments play a role in this cooperation, the EU as the political entity, the member states, and private companies are particularly relevant on the EU side. It can be seen that the investment approaches vary. Businesses and member states have very individual paths, whereas the EU takes a more coherent approach, which can be interpreted as a joint effort of the EU member states.

With a further focus on the EU approach, it can be seen that it is mainly based on cultural background, risk perception, challenges, and goals. All of these elements can be derived from the PESTEL analysis.

The cultural background is above all described by the concepts of human rights and individual liberties, which is also of great relevance in cooperation with other countries, such as Africa. Risk perception tends to be higher for investments in states that do not have the same policies and standards.

The EU faces challenges in the area of climate change, political instability, limited resources, demographic change and immigration.

The goals as the last influencing factor of the investment strategy include four elements:

- Investing in people - education, science, technology, skill development
- Strengthening resilience, peace, security, and governance
- Mobilizing investments for African structural-sustainable transformation
- Migration and mobility

To achieve these goals, the EU implements development aid as part of the investment strategy, which is performed by four programs (e.g. Pan-

African Program). This component continues to play a significant role in the investment strategy, favoring African countries that share values similar to those of the European Union.

The second pillar of the investment strategy, which aims to mobilize additional investment, is realized through the use of two funds (e.g. the EU Infrastructure Trust). Above all, this component focuses on the risk reduction of investments in Africa, which accommodates the higher risk perception of European investors.

The Chinese investment strategy

Cooperation between China and Africa has a long tradition. This tradition is primarily based on the so-called "five principles of peaceful co-existence," which include collaboration between China and non-communist countries such as Africa. The principles established in Bandung in 1954 include respect for territorial integrity, rejection of aggression, non-interference in internal affairs, equality and mutual benefit, and peaceful coexistence. These factors continue to play an essential role in the relationship between China and Africa.

From the perspective of China, Africa became increasingly relevant between the 1960s and the 1970s, especially from a political point of view. The strategic idea behind this cooperation was based on the approach to generate international support in the implementation of China's political goals. This ranges from the encouragement of African countries in multilateral organizations such as the UN and the WTO to the implementation of the so-called "one-China policy", which includes the rejection of Taiwan. This approach was consistently successful from China's point of view. In addition to political motives, increasing relevance of economic interests has been established since the end of the 1990s. This was mainly due to the increasing liberalization and different orientation of the Chinese economy which began at that time. These approaches were supported by a promotion of Chinese direct investment in foreign countries, captured in 2000 as part of the so-called "going global" strategy.

To underpin this approach, the FOCAC (Forum on China-Africa Cooperation) was launched in 2000 with a focus on guidelines and initiatives that are crucial for economic and political cooperation. There are three main pillars of cooperation, which were decided in 2012 (FOCAC):

Non-interference in internal affairs

This means that China does not interfere in internal affairs, such as the governance or human rights situation of an African state, and thus both

countries remain independent, maintaining absolute sovereignty and territorial integrity.

Strategic partnership

The so-called "south-south" cooperation, i.e., engagements between two developing countries (China and Africa) should lead to the realization of strategic interests based on equality, trust and mutual economic benefits.

China's identification as a developing country

Within the framework of the partnership, China explicitly defines and identifies itself as a developing country, thus placing itself clearly on a par with the cooperation countries from Africa.

Looking at China, the actors that play a role in the cooperation between China and Africa can be divided into state, state-owned enterprises (SOE), and private enterprises. For instance, according to a study of McKinsey & Company, 10% of the 10,000 Chinese companies that are active in Africa, are state-owned enterprises, as opposed to 90% Chinese private companies. The fact that state-owned enterprises act primarily in the interests of the Chinese government and thus pursue the same ambitions, in contrast to the 9000 private companies, which seek mainly individual and profit-oriented interests, justifies the fact that especially the Chinese state and the state-owned enterprises are more closely examined. This also allows for a better comparison with the European approach.

Regarding the investment strategy pursued by the Chinese government and SOEs in Africa, these above-mentioned corner-stones play an essential role. However, the cultural background, risk perception, challenges and ambitions of China are also crucial to China's investment approach. Those elements can be derived from the PESTEL analysis.

Above all, the Chinese cultural background is based on hierarchy orientation, collectivism, orientation towards social status and materialistic orientation. Thus, for example, the person or the institution, which is superior to the citizen, decides in many areas about the life of the subordinate. Therefore, citizens also accept political decisions, even if they are negatively influenced by them (e.g. lack of human rights). Furthermore, the interests of society, and not the individual, have priority. Besides, the social differentiation counts, which is also recognizable in the power architecture of state and enterprise. Among other things, the materialistic orientation can be recognized by the fact that the material gain alone counts and consequences for other people, the so-called "outside group" are neglected.

Regarding risk perception, it can be seen that Chinese investors, prefer investing especially in politically unstable countries and weakly contested markets, resulting in a high-risk tolerance for investments.

China also has challenges to overcome which range from a weakening economy, high levels of debt, resource shortages, environmental problems to an aging population.

The ambitions pursued by China in its investment strategy in Africa are the following:

- Energy and resource security – resources (oil) and agricultural raw materials due to economic growth, “round-the-box” package
- New markets – the development of new markets for Chinese exports
- Structural change – from the production industry to high-tech industry
- Political interest – political support from African states and military influence

Pillars of Chinese investment strategy

The components of China’s investment strategy can be classified either in development aid or development finance.

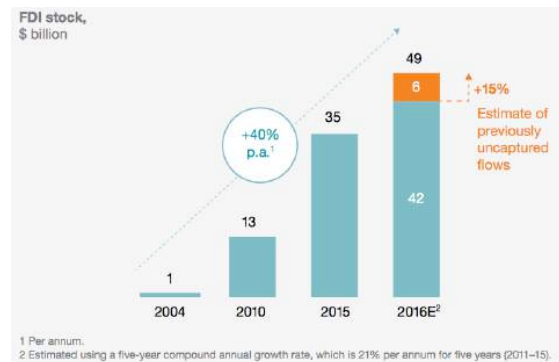
Grants, interest-free loans and preferential loans can be allocated to development aid. This is because all three financial resources are developmentally motivated and contain a concessional element.

- Grants are primarily provided in kind and are predominantly used for social projects such as the construction of a school.
- Interest-free loans are mainly used to finance infrastructure projects. The awarding of these two funds is being carried out by the Ministry of Commerce (MOFCOM) which is the leading Chinese development cooperation institute.
- In preferential loans, only the China Export-Import Bank (Exim Bank) lends to the African governments for projects that are primarily carried out by Chinese state enterprises.

Commercial loans from the Exim Bank and the China Development Bank (CDB) as well as a direct investment can be allocated to development finance due to the lack of a developmental objective and the superficial realization of economic interests.

- Exim Bank's export credits help Chinese exporters to operate abroad in Africa, primarily in the energy sector. The CDB supports Chinese companies in Africa based on economic credit selection criteria.

- Chinese direct investments (FDI) in Africa increased from \$ 491 million to \$ 35 billion between 2004 and 2014, according to a study of McKinsey & Company.



Graph 1: Chinese FDI stock in Africa in USD billion (McKinsey & Company)

As a part of the investment strategy, the Chinese government pursues economic cooperation with the African countries. Thus, China focuses primarily on development finance, whereby development aid makes up a small part of the collaboration. In the implementation of the investment strategy, above all, a combination of Chinese state-owned enterprises, the state, and Chinese state-related financial institutions such as China Exim Bank play an essential role. Due to the fact that investments are mostly secured by those financial institutions, China is able to invest in high-risk projects. The Chinese government mainly uses state-owned enterprises that offer complete solutions – so-called “turnkey projects”. If the African partner lacks the financial resources – primarily for infrastructure projects – the financing is secured with resources (“reserves-backed lending”). Thus, China also tackles some of its own challenges, especially its lack of natural resources.

Combined with cheap credit from state-owned financial institutions and the "non-interference" approach, the Chinese government, in cooperation with state-owned enterprises, can gradually achieve its goals and thus increase its impact in Africa - on economic and political levels.

A Comparison

The investment strategies of China and the EU in Africa greatly differ from each other. While the Chinese investment strategy focuses on economic cooperation, the EU combines economic and political elements. In the case of China, resulting from the cultural background, it can be seen that China puts greater emphasis on economic development and social improvements for the mass over the individual's individual liberties. This is evident in the context of its cooperation

with Africa, with high investment in infrastructure and a steady state. Following the principle of "non-interference in internal affairs," investments are also made in countries such as Zimbabwe, in which auto-rite regimes prevail that pay little attention to human rights and the political participation of their population. There is a positive correlation between political instability and the level of FDI. Furthermore, it can be seen that the better the political relationship between the cooperation countries, the higher the FDIs. This approach differs significantly from that of the EU which tends to poses economic and democratic demands on the partner country prior to making investment.

Concerning the European and Chinese investment strategy approaches, China primarily uses development finance instruments (conventional loans, FDIs) and approaches such as the "Angola Model". Combined with the fact that the Ministry of Commerce is mainly responsible for the development work, it shows how relevant business interests are in the context of China's investment strategy. Accordingly, development aid (e.g. grants) is relatively low.

In contrast, Europe is mainly committed to development aid programs only gradually shift to other investment approaches.

The roots for these differences can be explained by the different cultural backgrounds, perceptions risks, challenges, and ambitions. Based on the PESTEL-analysis the characteristics of all four elements differ between China and Europe.

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Existing stock-quoted investment funds based on demographic change/aging: How did they perform and why? What are future factors of success?

Demographic trends that influence the future investment directions

Submitted by Zhaorong Lai

Demographic funds are funds that aim to capitalize on the demographic trends, by investing in companies which can benefit from the demographic factors.

It is known to all that changes in global demographics bring business opportunities that can be explored and capitalized on. In order to assess the feasibility of investing in demographic funds, we checked all the existing demographic funds in Thomson Reuters and Bloomberg and produced a list of 19 funds with available return data. To analyze the performance of these demographic funds and see whether the funds have outperformed the market, we compared the 2-year and 8-year return of the funds with the overall market return (MSCI World). The comparison result shows that there are more funds having a higher return than the MSCI World Index in the two-year periods than in the eight-year period. Although there are funds that can outperform the market, not the majority of them performed well. The reasons for this comparison result could be many. Firstly, it is hard to beat the market over the long term. Investors can already benefit from the investment in demographic funds if they can beat the market in the short term. Secondly, the return of the demographic funds can be influenced by many factors. It is hard to separate political or economic factors in the overall market from the demographic one. Thirdly, we need to see that the demographic funds not only hold companies that are directly related to the aging population like the ones in the healthcare sector, they also hold companies from the financial sector, consumer goods & services sector, technology sector, and industrials sectors. All these other sectors benefit from the demographic trends in less direct ways. The holding of companies in different sectors serves the purpose of risk diversification but also brings in more factors that could influence the return of the demographic funds. Additionally, our sample is too small, which could also make our comparison not representative.

We need to see from the bright side that compared with the eight-year results, the last two-year ones shows that there are more demographic funds that can outperform the market. The concept of investing in demographic trends

only became popular in the last decade and many demographic funds have less than 10 years of portfolio management experience. Demographic changes are shaping the world now. Given time, the demographic funds can profit from the development of industries and sectors driven by demographic trends. Unlike economic variables, demographic trends are predictable. With a good understanding of the future demographic landscape, the return of demographic funds can be promising.

Demographic changes that could influence the future

It is common knowledge that the demographic changes have major implications for the economy as a whole as well as on individual industries. The upward trend in world population size until 2100 means a larger global market and changing workforces. However, the lower fertility rate slows down the population growth rate and results further in the aging population. The aging population and higher life expectancy bring up more need for medical treatments. Furthermore, with the growth of the economy in Asia, the number of middle-class people increases, resulting in more consumption and driving the economy upward. The emerging market becomes the engine of global growth.

The demographic funds that invest in companies which benefit from demographic changes invest actually in the long-term demographic trend. For instance, fidelity global demographic funds, one of the 19 funds in our list, explore opportunities to benefit from the three main demographic trends "more people, more old people, and more wealthy people". Understanding what kind of demographic trend will shape the world is the first step in the analysis of future success factors for demographic trends.

Investment in developed countries or emerging market

We could see from the portfolios of the 19 funds in the list that among the selected companies over 70% of them headquartered in Europe and America. It is reasonable since developed countries have better trade and legislative environment and a more mature market with higher consumption capacity. Also, the majority of

companies in the portfolio are giants that established in the developed country many years ago already and experienced years of development when the developing world was still underdeveloped. This is the historic reason that attributes to this result.

When deciding whether to invest in developed countries or developing countries, global coverage is still an optimal choice in the short term, since the spending on healthcare and luxury goods in the developed countries is still high and far from reaching its end. Despite the promising growth in the emerging market, the developing countries still experience rapid technology changes and are in the process of developing better legislation and market systems. Additionally, giants that have global market coverage already launched initiatives to adapt to the emerging market.

If we look into the long-term future, the focus should be in developing countries as we can see promising investment opportunities in the developing countries with increasing working-age population and dramatic demographic changes. In a speech of IMF managing director Christine Lagarde, she mentioned that as a group, emerging and developing economies now generate almost 60% of global GDP in the past half century as they caught up with developed countries. 80% of global growth since the 2008 financial crisis was contributed by them. Also, according to the research *Global Powers of Luxury Goods* from Deloitte, the total sales volume of clothing and footwear in Asia, Latin America, the Middle East, and Africa combined will outnumber the sales in Europe and North America. The boom in emerging market change the landscape of the global market and companies need to adapt to the taste of the emerging market. Demographic funds which seek to profit from demographic changes should invest heavily in developing countries, which now experience the economic growth and dramatic demographic changes at the same time.

Investment in industries

The development of industries can be attributed to many factors. Although demographic trends cannot be the only decisive factor, a conclusion could still be drawn about which industry may have future growth potential from the demographic trend.

It is known to all how the aging population could impact on healthcare and how the decreasing workforce in developed countries will boost the development of automation. The older people get, the more frequent and longer the hospital visit can be. With an overall decline in the size of the

workforce population, the lack of nurses would be an even severer problem to solve. The reasonable solution is the technology breakthroughs and robotics. Medical technology has already delivered a strong result even with rapid technological changes and regulatory uncertainty.

Two main breakthroughs in MedTech field are robotics and remote monitoring. Robots are the replacement of medical personnel in routine work. It helps to relieve the stress of doctors and frees operation procedures from personal operational mistakes. For instance, the fund that ranked number 3 in our list held a MedTech company Intuitive Surgical Inc., which designs and produce intelligent surgical system to achieve surgical precision in an ideal way. The second trend, remote controlling, is another new solution for the lack of physicians. With wearables like watches, it can monitor the heartbeat and sleeping quality. What's more, one of the future trends of remote monitoring is to use algorithms to link the behavior data with a person's cognitive state in order to identify potential upcoming health changes.

In the consumer goods & services market, the landscape of luxury goods already changed to adapt to the digital-first attitude of the new generation (1980-2000) after this generation gains more consumption capacity. Many brands have launched online retail market and conducted advertisement campaign on the internet. For instance, Gucci launched a redesigned website in 2016 and offered visual presentation and stories. In order to meet the needs of the booming market, Gucci launched in 2017 online stores in China and the Middle East (Deloitte 2018). This actually helps to identify the consumers. Before, it is harder to search for the target customers. But now with the internet, brands can do advertisement to people who search specific key words on the internet.

In the financial sector, Blockchain and Fintech are driving a revolution. From the report from Ernst & Young *FinTech Adoption Index 2017*, it is not unexpected to see that the younger generation, compared with consumers aged 45 years and older, have not yet established a strong relationship with traditional bankers. They are reluctant

to accept Fintech. The 25- to 34-year-old consumers are the most comfortable with FinTech and also the ones that require a wide range of financial services. However, Fintech is not something only for the younger generation. Certain FinTech services such as nonbank payment system are popular across multiple age brackets. In regard to the traditional services that

banks offer, retail banking is the segment that will be influenced the most by demographic changes. Having a higher life expectancy and better economic situation, people have an increasing need in wealth management and investment to ensure the lifelong financial wellbeing. For instance, the American financial institution Charles Schwab, held by the No.1 fund in our list, offers as its biggest selling point individual retirement accounts. Customers can get tax benefits for saving money in these accounts for their retirement. The financial planning plays a more and more important role in the whole retirement planning process. To satisfy this need of financial planning for retirement, the profession of certified retirement financial advisors entered into the market to give people professional advices on how to save enough money to cover the living cost in their “silver age”.

Regarding industrial sector, aging leads to greater automation. Taking US labor market as an example, it is undergoing major demographic changes and has invested now heavily in new robotic and other automation, since the decrease in numbers of middle-aged workers in the job market and the fact that robots are most substitutable for this age bracket. The countries which experience the most dramatic demographic changes invest and proceed most in robotics and automation. Demographic changes not only encourage the adoption of technologies but also their development. (Acemoglu & Restrepo 2018)

As for technology sectors, in one aspect, the older generation is less willing to accept new technologies. The paper of Karsten Wasiluk shows that companies with a larger share of elderly workers update their technologies less frequently and are less comfortable to invest and adapt to new technologies. But in another aspect, the generation shift has changed the demographics of technology sectors. It is known to all that MedTech and Fintech are becoming the biggest trends to satisfy the increasing demand of people and to improve people’s living in a cost-saving way. The adoption of new technologies is only a matter of time.

The Wisdom of picking the right portfolio

During our interaction with the class members, we asked them what their portfolio would be if they were a fund manager. The result we got (in Figure 1) is interesting. Firstly, they all believe in the demographic funds. They are convinced about the investment opportunities that can be explored in the demographic changes. Secondly, they all choose to invest heavily in healthcare and robotics sector, since they all recognized the need for healthcare and the most possible low-

cost solution for it. Although the majority of existing demographic funds do not invest the most in healthcare and the ones that invest the most have not delivered the best results among the other, the growth prospects of healthcare and technology are promising.

The big trend is something that we should definitely follow, but investing in a portfolio is actually about choosing the high-potential companies that will lead the industries for the coming years. And it is known to all that individual company performance deviates from the equity market performance. From the selected 19 portfolios we see the trend that funds tend to choose giant companies that have international coverage. This is a good way to diversify risk.

Furthermore, we could not overlook the fact that different countries still have different demographic patterns despite the main global trends. For example, we could easily draw the conclusion that the aging population will shift the spending from essentials to healthcare with the cumulative fortunate they possess. But that is not the case for China. In China, most people aged 55 or older went through the Cultural Revolution. The harsh economic and political conditions at that time formed their consumption behaviors. Residents at the age bracket from 55 to 65 spend a larger share of in food (50%) and a smaller share in apparel (7%) compared with the 10-year younger generation, respectively 38% and 13% (McKinsey 2012). The investment strategies could be different according to the demographic and economic situation in different countries.

To conclude, Investing in demographic trends are more promising than other economic trends since demographic changes are more predictable and irreversible. In order to capitalize on demographic trends, four future success factors are: the right understanding of demographic trends, the right decision of where and which industries to invest, and the identification of future leading companies in each sector.

While some companies can be better positioned in meeting the future demand, they can profit more from the demographics.

Since demographic funds profit mainly from long-term corporate growth and building the right portfolio is also not easy even with the knowledge of demographic landscape, demographic funds still have a long but promising way to go.

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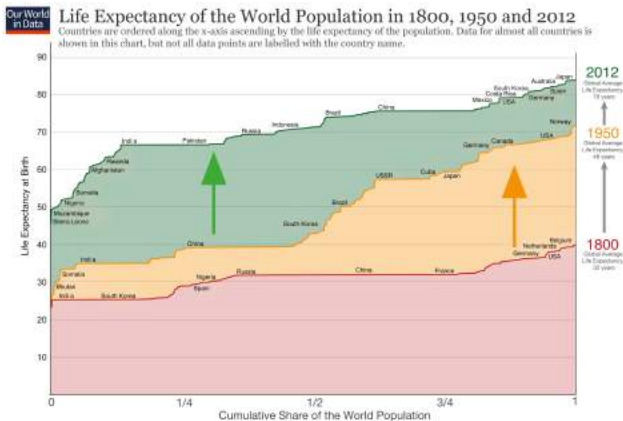
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Investing in Global Aging

Submitted by Shengchang Qiu

A Greying World

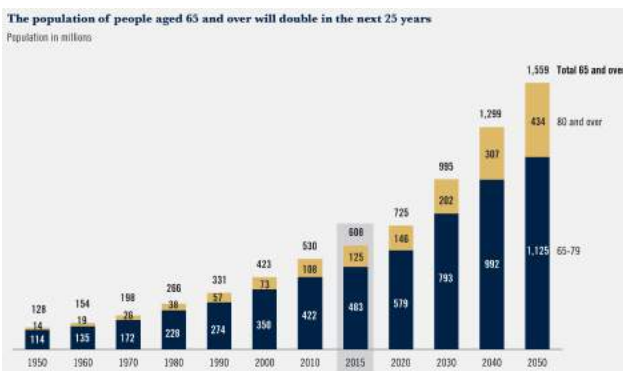
Aging populations are now a worldwide phenomenon and the trend is accelerating. For most of human history, reaching old age was an exception. Scholars estimate that up until the mid-18th century the global life expectancy was only 25 years.



Data source: The data on life expectancy by country and population by country are taken from Gapminder.org. The interactive data visualization is available at OurWorldInData.org. There you find the raw data and more visualizations on this topic. Licensed under CC-BY-SA by the author Max Roser.

Source: Our World in Data

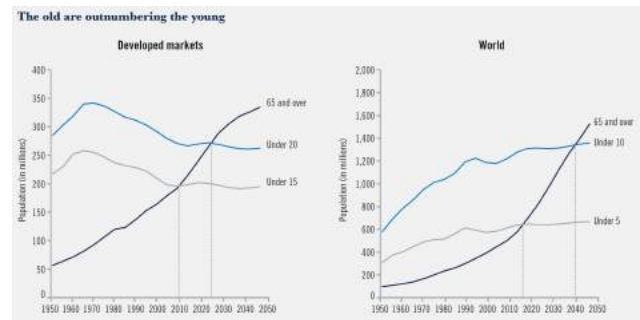
But nowadays, population aging has already become a trend spreading across the world. Global life expectancy which was 47 years by 1950, has reached age 72 today, increased by 25 years in only 60 years, in an infinitesimal fragment of the entire human history, according to World Health Organization.



Source: United Nations Population Division

Due to declining fertility, the share of older adults in the global population is also increasing, both in absolute and in proportionate terms. According to United Nations, by 2040, the global population of those aged 65-and-older will reach 1.3 billion, double what it is today. Its proportion is expected to rise from 10.8 percent in 2009 to almost 22 percent by 2050.

For the first time in history, the old will outnumber the young. By this year, 2018, the global number of adults aged 65-and-over will outnumber children under the age of 5, according to United Nations. Meanwhile in developed countries, the number of adults aged 65-and-over has already outnumbered children under the age of 15 in 2010.



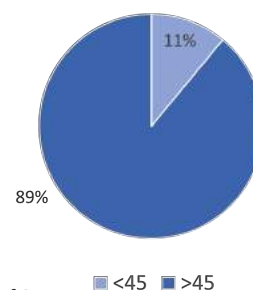
Source: United Nations Population Division

Silver Economy

The aging population have resulted in significant changes in the economic landscape. The elder generation now owns strong and ever stronger spending power. As a result, their consumption preferences will generate a considerable shaping power on the domestic economy.

In developed markets, retirees are making up a greater and increasing share of wealth. According to research from McKinsey & Company, by 2020, 89% of investable assets in the US will be held by people older than 45. According to Price Waterhouse Coopers, 78% of Australia's wealth is also owned by the over 45s.

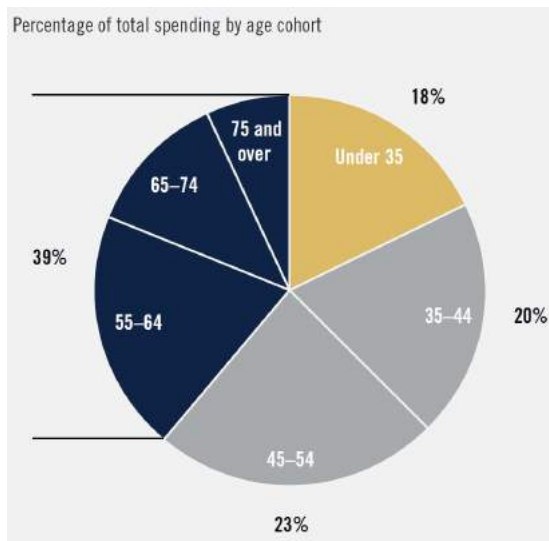
Investable Asset held by different age group in US



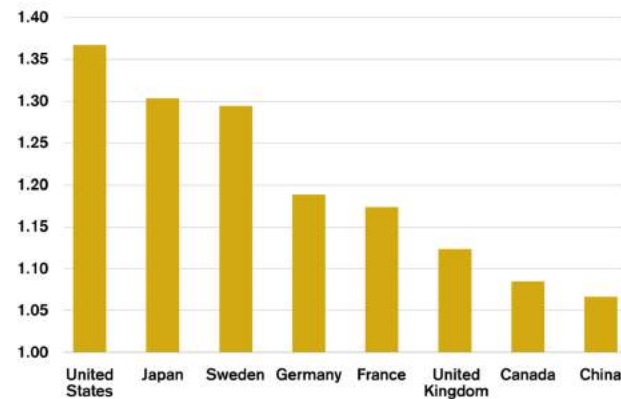
Source: McKinsey & Company

Not just of wealth, the 55-and-over population makes up also a significant share of consumption, accounts for 39% of the total spending in the US in 2015, according to US Bureau of Labor Statistics. The same is also true in Japan, where

almost 50% of total consumption is driven by households whose heads are older than 60, according to an analysis by the Nippon Foundation.



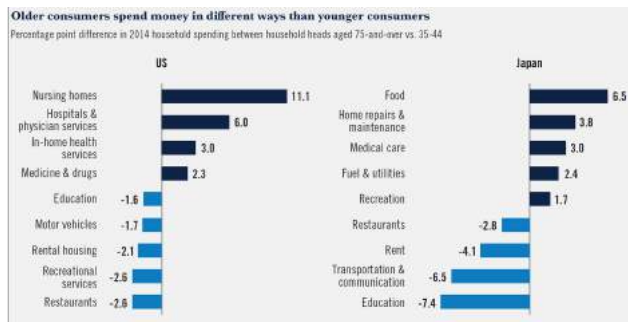
Source: US Bureau of Labor Statistics



Consumption by seniors is significantly higher than for the active population
Per capita consumption of the 65+ age relative to the age group of 25-64. Source: National Transfer Accounts, August 2016 Data Sheet, Credit Suisse.

Source: Credit Suisse

The spending behavior of individuals varies in systematic ways as they proceed through life. Decisions in both major (attending school, rearing children, utilizing financial services, funding medical expenses) and minor consumptions (eating out, joining the gym, choosing vacation packages) all vary with age.



Source: Oxford Economics

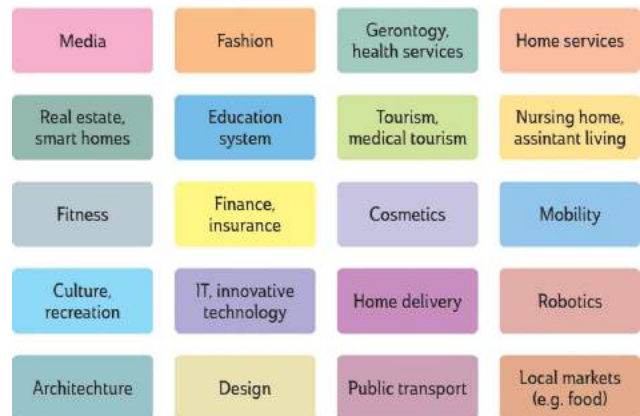
According to a recent research by Oxford Economics, household with their heads aged 75-and-over spend more on healthcare services.

Conversely, they spend less on education, consumer durables (including owned vehicles) and some recreations.

The shift in consumption patterns requires corresponding transition in the domestic economy. Such business opportunities as well as its overall impact on the economy are summarized now as “Silver Economy”.

Silver economy affects all economic segments. New demand will enter the market, with clear and specific needs accompanied by a sufficient amount of income as well as a high level of willingness to pay.

Economic segments of the silver economy



Source: The New Hope for the EU – Silver Economy

Investment Opportunities in Global Aging

More specifically, we can expect the following economic segments to benefit from the global aging.

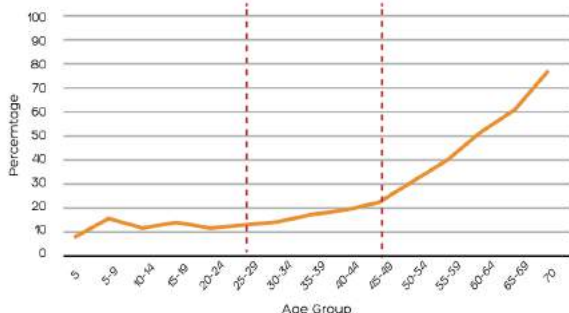
Health and social services

On average, healthcare consumption increases with age. For example, according to Eurostat, individuals aged 50+ accounted for almost 70% of all inpatient hospital days in Europe in 2013, despite being only about 40% of the population. As a result, the number of people aged above 65 that will need health care will increase substantially over the next few years and this puts direct pressure as well as demand on the health care system.

Specifically, pharmaceuticals and biotech will benefit most directly from the growing elder population. Heart disease, for example, leads to global costs of USD 500 billion per year, according to the American Heart Association. Cancer, another widespread disease related to aging, costs over USD 1.1 trillion in 2010 in physician fees, diagnostics, hospital visits, prescription drugs and other expenses, according to World cancer report 2014. We are now seeing significant amounts of budgets from pharmaceutical

and biotech companies spent on research and development activities. We can expect such potential medical progress will provide more effective and affordable cures for diseases or disorders related to aging, and in turn stimulate new demand and market opportunities.

Percentage of People of Having At Least One Chronic Disease



Source: Census and Statistics Department of Hongkong (2013)

New developments of technological and digital solutions will also help to transform and integrate the health and care systems. By enabling older people to stay longer in their homes, better quality and more personalized solutions can be brought to their doorstep. For example, healthcare professionals are increasingly using electronic patient records and digital systems to facilitate the patient journey and improve medical preventions.

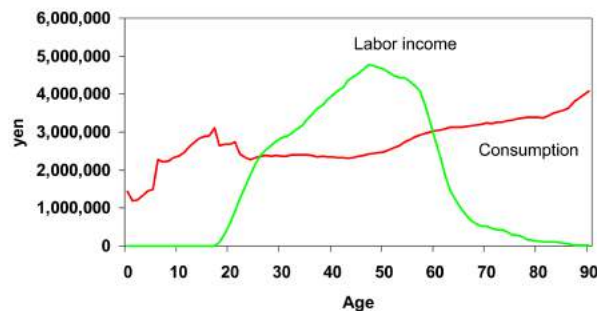
Beside direct medical treatments, industries related to active and healthy aging such as healthy eating, physical activity, the use of medication as well as psychological and cognitive treatment will also see new opportunities. For example, increasing emphasis on healthy living will mean stronger sales growth in vitamins and dietary supplements. The global market for healthy ageing is therefore also expected to be sizable and growing.

Financials and insurance

According to the Life-Cycle Hypothesis, individuals have to save at middle-age in order to prepare for the low-income senior life. Due to the growing life expectancy and the resulting rising future expenses at retirement, such economic burden for those in working ages is increasing. However, state health and welfare systems are coming under strain because of the growing number of retirees. With the growing concern for the sustainability of social insurance and the possibly declining personal welfare after retirement, people are increasingly inclined to plan on a saving scheme at a younger age to cover future expenses. Under such trend, financial institutions that are well positioned to help people save in the accumulation phase for their old age are going to

meet higher demand and earn potential higher revenue.

Economic Lifecycle Per Capita, Japan, 2004



Source: Ogawa et al., www.ntaccounts.org

Population aging, rising longevity and rising healthcare costs are likely to increase the demand for insurance as well. In an aging society, insurance companies will focus more on protection products for the elderly, such as health insurance for elder employees, life insurance products and life annuities, and benefit from the growing number of subscribers.

Furthermore, as senior citizens are holding increasing amount of wealth and must plan for their retirement years with rather fixed amount of savings, but at the same time don't have abundant financial knowledge, they will require professional financial agencies to help to plan for expenses at retirement. Besides, the needs for estate planning services will also increase. As a result, the demand for wealth management services from senior-aged group will likely to see significant growth.

1.1 Transportation and smart home solution

The mobility of the older adult is sometimes impaired. According to a survey conducted by English Longitudinal Study of Ageing, among the over 80s, less than 55% find it easy to travel to a hospital, a supermarket or a post office. Much of existing transport services for older and disabled people are highly dependent on volunteers. As a result of the ageing population, these voluntary services will become ever more under pressure.

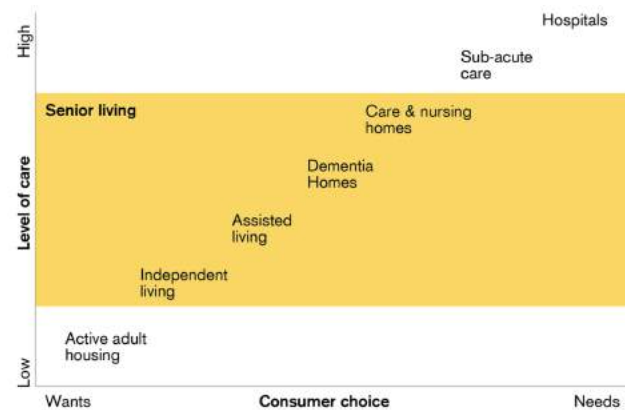
As elders are relatively restricted in terms of mobility, they will also spend more time at homes independently. Moreover, most older people also prefer to remain in their own home as they get older. Amongst the group of older people that need day-to-day assistance or ongoing healthcare, over 80% would still prefer to stay at home, according to American Association of Retired Persons. This put forward higher requirement for their housing equipment. However, many homes at present are not built to adapt to

such changes, nor include smart home solutions. This leads to unnecessary hurdles for independent living in older age.

Such problem can create new demand and innovation opportunities. An increasing offer of the public transport system via the introduction of driverless cars and public transport can alleviate the problem and encourage the mobility of older people. Driverless transport would facilitate access to town centers, medical appointments, leisure and tourism activities without increasing the burden on social services. In addition, adaptable and smart home solutions can help update and better support the independent living of older people. Therefore, the markets for such innovations can anticipate seeing sizable growth in the upcoming future.

Senior housing

Because of the rising dependent ratio, there are fewer children to provide at-home support to their aging parents. Even though seniors wish to stay in their communities independently for as long as possible, but because of the increasing needs of assistance, there may eventually come a time when a move to a senior housing community is needed.



Structure of senior living and care facilities
Source: Credit Suisse

Independent living communities are similar to traditional apartments, but in addition offer services such as dining facilities, housekeeping, and recreational activities. Assisted living communities offer additional support services, and generally cater to individuals who need assistance with daily activities but do not require nursing home care. Dementia home is a growing specialty of assisted living that focuses on seniors living with dementia or Alzheimer's. Nursing homes are aimed for 80-and-older and provide around-the-clock nursing care for seniors.

The senior housing industry is anticipated to grow at an unprecedented speed. According to research firm Senior Housing Analytics, the

demand for new senior housing units in the US is projected to surge from 2015 to 2030, representing an increase of roughly 770,000 units in total.



Source: Senior Housing Analytics

Consumers and recreation

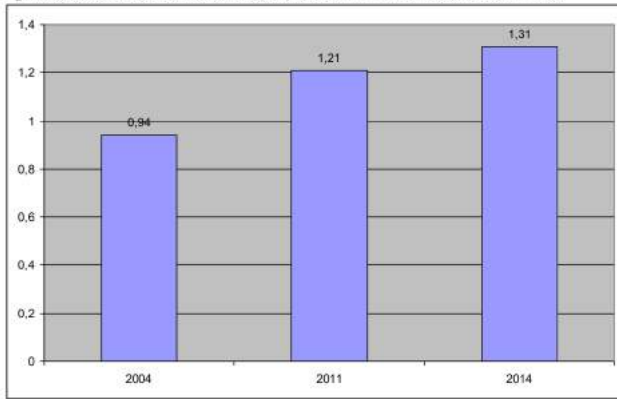
The inability of seniors to navigate large stores along with the difficulty in accessing products on shelves (either too high or too low) could mean that convenience in shopping will become more important for these elder consumers. This makes local merchants more valuable in a silver economy. Particularly, segments like online shopping facilities, food and drug retailers, and other retailers with smaller next-door outlets can benefit from a growing proportion of elder population.

In addition, the desire to look younger should drive higher spending on personal care and beauty products, especially anti-aging. Vision impairment is common as people grow old, and this provides a huge opportunity for prescription glasses and contact lens manufacturers.

For seniors, spending on clothing and restaurants slows down over time, because they are less likely to follow fashion trends and are more inclined to cook on their own.

Meanwhile, a bigger share on spending moves toward leisure and tourism. We have observed growth in the senior tourism market in the recent years. Because of the increasing amount of disposable wealth and the plenty of spare time of seniors in the foreseeable future, we can anticipate such growth will accordingly continue or even accelerate. Particularly, cruise liners will benefit from the growing spending power of senior citizens as over 66% of its demand comes from older people.

Figure 24. Number of EU senior tourists' (55+) visits within the EU in 2004-2014, in million

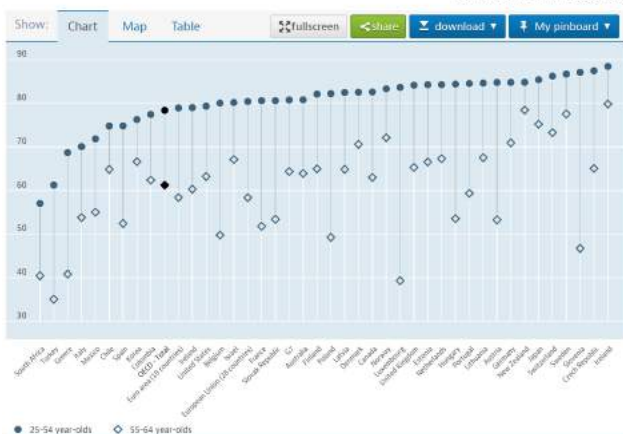


Source: Eurostat (2015)

Adult education and training

People aged 55-64 in OECD (Organization for Economic Co-operation and Development) has substantially lower employment rate than that of the 25-49-year-old, with 58.5% compared with 76% in average, according to OECD Data.

Employment rate by age group 25-54 year-olds / 55-64 year-olds, % in same age group, Q3 2018 or latest available
Source: Labour: Labour market statistics



Source: OECD Data

In addition, people aged 65+ are estimated to spend an average of 80% of their time at home, and 90% for people over 85, according to a research from Help the Aged. The resulting feeling of social isolation can have detrimental effects on an individual's physical and psychological well-being.

Education and training for elder people can take on this opportunity and contribute to increasing the employability of the elderly and help them become more productive for longer periods. Besides, such social get-togethers can provide mental health benefits and increased seniors' socialization and interaction with the community, leading to less social deprivation and associated health challenges.

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Historical performance of demographic funds and potential investment opportunities

Submitted by Yufeng Zhang

Demography is a hot topic undoubtedly all over the world. The same thing is happening in financial markets, demographic strategy is attracting more fund managers than before. Or to be more precise, investing under the theme of ageing and corresponding industries is much more popular than ever before.

We are quite curious about the performance of these funds. Whether investing under the demographic strategy is profitable or not? Are they out-running the market? Would they be more risky or stable than other funds?

After screening on Thomson Reuters and Bloomberg, and then investigating deeply, 19 funds are found using a demographic strategy. However, if we look back in 2010, there were only 7 funds that adopted this strategy. We are curious about the historical performance of these funds, and the potential reasons behind them.

An easy approach to measure the historical performance of the funds is to calculate their cumulative returns and compare them with MSCI World Index, which is a market cap weighted stock market index of 1,649 stocks from companies throughout the world. This index is the most commonly used benchmark when researching on profitability of funds.

Figure 1 and figure 2 give an overview of the past 2 years' history in this submarket. Figure 1 shows the cumulative return of all the 19 funds since October 2016. It is the longest period that all the 19 funds share.

Illustrated on the chart, performances of the 19 funds vary a lot from each other. The highest return is 31.85%. Allianz Global Equity Unconstrained is providing such a well-performing investment opportunity. In the meantime, UniCredit Evoluzione Trend is the worst actress on this stage, providing a cumulative return of -1.34% in the past 2 years. Importantly, the 2 years return MSCI World index is 21.9%.

Figure 2 depicts the comparison between the capital-weighted average of the 19 funds and the MSCI world index. Fortunately, those better performing funds usually controlling more capital than worse funds. The weighted average of the 19 funds is overwhelming in the most period (16 months out of 23 months) in the past 2 years, although finally MSCI wins.

From a statistic aspect, an analysis on a period of 2 years (23 months) is not enough, a research on longer span is needed. On the one hand, investing under the theme of demography become more and more popular. On the other hand, it means that, there are not many funds doing such investment some years earlier. Facing such a trade-off between the amount of funds and observation span, we decide to draw another chart dating from November 2010. For this 8-year span, our list remains 7 funds.

Depicted on Figure 3, in the case of 8 years, 5 out of 7 funds failed to outrun the MSCI world index. The best performing fund is Allianz Global Equity Unconstrained, again, as it did in 2-years span. And we can see how disappointing the worst fund is. If you have invested 100 euro in Guliver Demografie Wachstum fund in Nov. 2010, you can get only 129.83 euro today. But if you invest the money in MSCI global index ETF, you can receive 205.27 euro, after 8 years.

Again, we draw the chart of the weighted average of the remaining 7 funds. On figure 4, the average of demographic funds is fluctuating around the MSCI index. Like the situation in a 2-year span, the funds with the higher return are managing more capital, and the weighted average of the 7 funds is overwhelming in the most period (63 months out of 94 months) in the past 8 years. However, from a prudent statistic perspective, we cannot say that in 8 years case, demographic funds are generating premium return averagely, which can also be supported by figure 4.

There are a lot of reasons that contribute to the co-working between demographic funds and MSCI World Index. For instance, this submarket is just at its early stage that only 19 funds are using demographic strategy. It is already a satisfying transcript. Additionally, since there are not many competitors in this submarket, it is not market with perfect competition. Therefore, its efficiency still has a large space to improve. As time passes on, more and more funds will adopt a demographic strategy. Higher competition in this submarket will definitely lead to better performance than they did before.

Although the cumulative curve of demographic funds' average performance is going through an almost synchronous path as the global major stock market, we would investigate into the holding portfolios of the funds. This time, we will not

only look at their return, but also consider their stability. In order to take risk management skills of the funds' managers into account. We introduce a ranking score which contains 50% of Sharpe ratio and 50% of Treynor ratio. The formulas are the following:

$$\text{Sharpe Ratio} = \frac{R_p - R_f}{\sigma_p}$$

$$T = \frac{r_i - r_f}{\beta_i}$$

Where, R_p is Portfolio Return
 R_f is Risk-free rate
 σ_p is Standard deviation of portfolio's excess return
 r_i is Portfolio Return
 r_f is Risk-free rate
 β_i is Portfolio Beta

Both measures the fund's ability to generate return in excess of the risk-free rate with punishment on too high volatility. Sharp ratio focuses more on portfolio volatility, while the Treynor ratio focuses more on the systematic risk of the portfolio. In a nutshell, if a fund has a higher Sharpe ratio and a higher Treynor ratio, it has higher ranking score under this methodology, which means this fund has relatively higher return and lower risk level.

When we are talking about demography, we usually analyze via two approaches: industrial and geographic. That is also where our interpretation will be based on.

The table on the right-hand side is our ranking result based on the ranking score system mentioned above. You may find Allianz Global Equity Unconstrained quite familiar, it is still the top demographic fund not only in terms of return, but also after taking risk-adjustment into account.

On table 1, we can see two Chinese funds is performing badly after we take risk management into consideration. The reason is insufficient diversification. I would like to take them as negative example in this analysis. Capital Chinese Golden Age invests 92% in Mainland China, HK, TW and Macao, in terms of geographic risk diversification, the fund manager should be fired. The other fund, China Life AMP CSI Old-Age is following a wrong strategy. It is investing 41.07% in the manufacturing industry. Such a proportion is apparently too much.

TABLE 1: RANKING

	Funds' Name
1	Allianz Global Equity Unconstrained - A
2	Fidelity Funds - Global Demographics Y-ACC
3	CTBC Ageing Income Balance Fund A USD
4	CPR Invest - Global Silver Age - A - Acc
5	KB LO Golden Age Equity Fund of Funds
6	Guliver Demografie Wachstum A
7	Amundi Orizzonte 2020 Silver Age
8	LO Funds - Golden Age (EUR) M A
9	Allianz Global Investors GI Demographic Trends
10	CPR Silver Age - E (C)
11	IFP Lux - Global Age Fund EUR
12	Candriam Equities L Global Demography
13	Amundi HK-Global Age Planet Opp Clssc
14	Actio - World Demographics Fund C
15	UniCredit Evoluzione Trend A
16	iShares Ageing Population UCITS ETF USD
17	Capital Chinese Golden Age Equity Fund
18	Generali Investments SICAV-Euro Future Leaders
19	China Life AMP CSI Old-Age Industry Index

After computing their ranking score, combined with the holding portfolios, we run a correlation analysis between a fund's ranking score and its holding percentage in terms of both industry and geography. However, these funds are not sharing a long horizon in which their holding portfolios are available. We only conduct a static correlation based on their latest holding bar (mostly of June, July and August)

Presented by table 2, a higher proportion invested in healthcare, consumer goods/products and financial industry will lead to a higher ranking score, while information/technology and industrial have negative impacts on ranking score.

TABLE 2: Correlation of industry

Industry sector	Correlation
Healthcare	0,43
Consumer goods/service	0,39
Financial	0,29
Information/Technology	-0,27
Industrials	-0,51

As for healthcare industry, the more elderly people in a country, the more demand for healthcare goods and service. As life expectancy in most area on the globe continues to rise, additional healthcare resources and service innovation is needed globally to deliver the long-term care and chronic disease management services required by a rapidly increasing senior population.

Consumers goods and service has a correlation ratio of 0.39. With lower fertility rate, baby product manufacturers and baby service providers will undergo a decline. But when it comes to the whole industry of consumers goods and services, positive effects are witnessed. For instance, the lower birth rate will lead to higher women income, at least 1-year salary for one birth, while 80% of daily consumption decision is made by women.

Financial industry also has a slight impact. In an ageing society, more fortune is controlled by elderly people, who are more likely to entrust financial intermediary to invest their fortune than youngsters. In such a situation, financial agents get more opportunities.

Information/Technology has tiny negative influence on ranking score. There might be several reasons for that. Most companies in technology are focusing on long-term development, therefore their short-term performance will be relatively lower.

Also, demographic funds investing in technology company may hold a belief that technology especially robotics will help a lot in an ageing society. But, the decrease of labor force due to ageing problem is not that significant. We may be expecting too much, in terms of current situation.

For the industrial company, we see a correlation coefficient of -0.59. Manufacturing industry is more sensitive to the declining supply of labor force. Besides, the high demand of healthcare sector also deteriorates the condition. In addition,

don't forget supply surplus of higher education which is another feature of demography trend. People graduated from a university may be less willing to work in a factory.

What about the influence of geographic proportion on funds' performance. On average, the funds invest 39% of their capital in North America and 35% in Europe, which means only 25% of raised money is invested in Asia, Africa, South America and Pacific. Although the funds call themselves demographic funds, they are investing on the theme of ageing. Very limited capital is used for Africa's high fertility rate.

Besides, we find that geographic impact is highly dependent on the global economy and international politics. Because the return of the funds is aggregated by the stock prices of the companies they have invested, funds' performances will be easily and unavoidably affected by domestic or global stock market. Since the holding portfolio data is only available for this year, the Sharpe ratio and Treynor ratio is also for this year only. The results below may be more influenced by well-performing US stock market and decreasing market index in China than demographic reasons. A prudent analysis requires deeper research with a longer time horizon. The results of correlation analysis are shown below.

TABLE 3: Correlation of Geography

Region	Correlation	Population Growth %	Elderly %
North America	0.65	0.73%	15.57%
South America	0.16	0.91%	8.04%
South Asia	0.10	1.21%	5.72%
EU	-0.32	0.08%	19.77%
East Asia	-0.36	0.35%	10.64%

Source of population growth rate and elderly ratio: World bank

For our research, there are some limitations should be announced. Demographic topics are very hot in society, but since demographic strategy is still at its emerging stage, there are not many funds investing in it. Therefore, we can only find limited funds. Due to the small sample, our results are probably biased.

The classification frame on Thomson Reuters is controversial. For example, geography is classified as where the company's headquarters is located, other than where their business takes place. Visa and Facebook, are classified as US companies, but they are presenting the global economy to some extent. Roche is Swiss company and selling drugs in several countries.

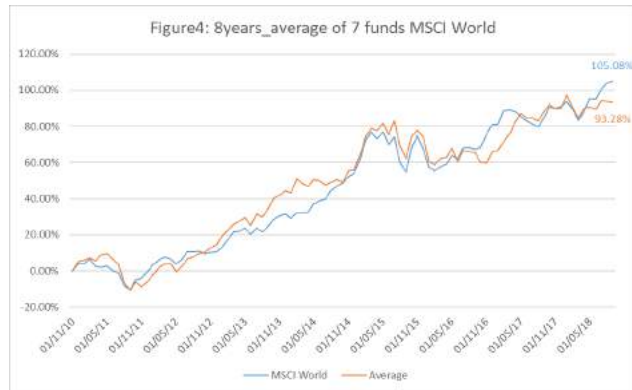
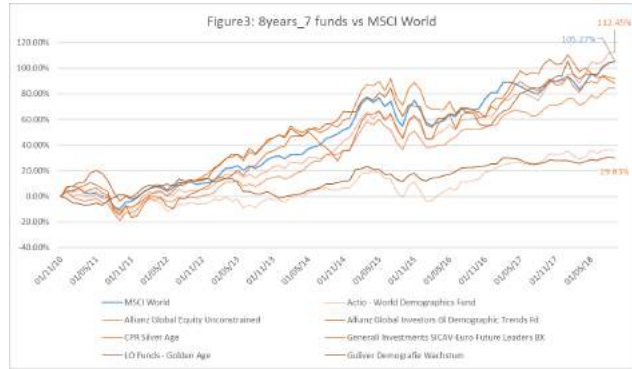
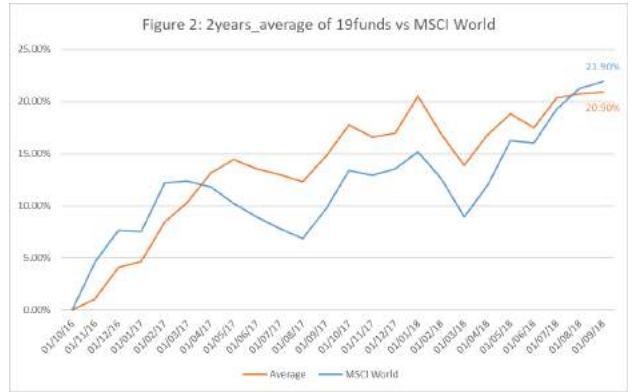
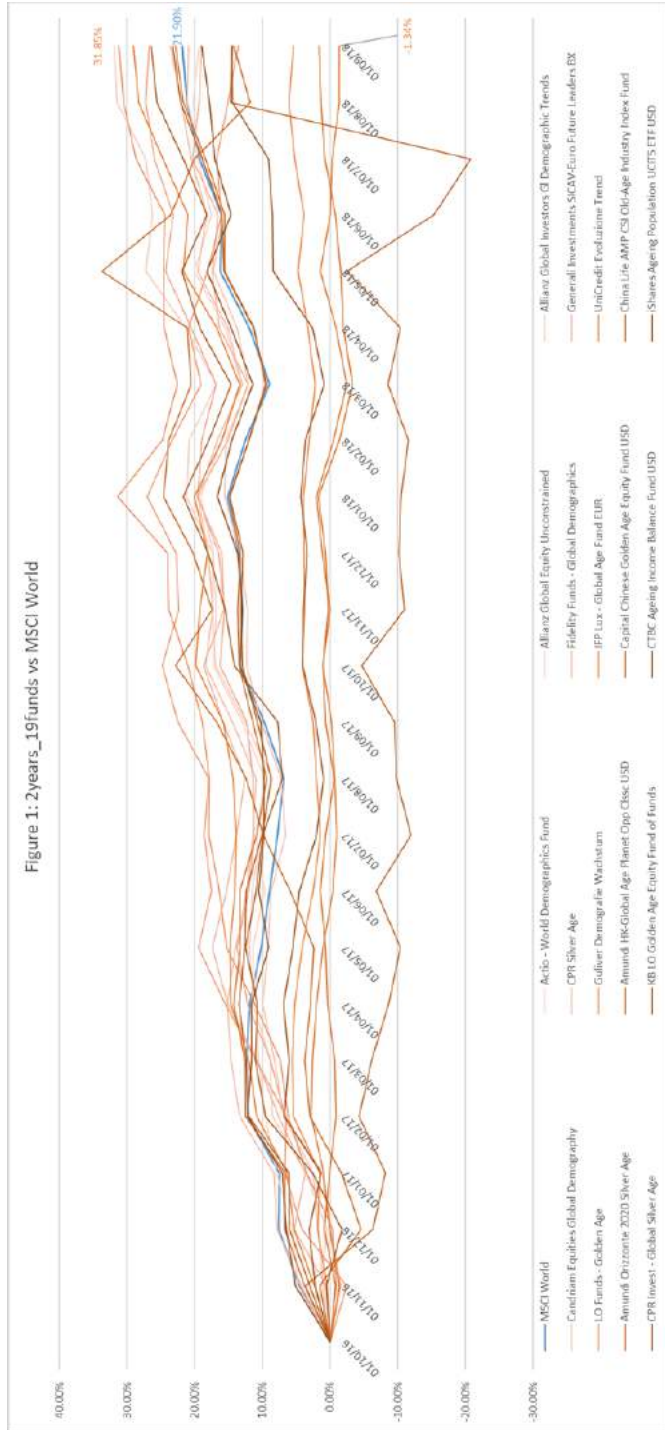
Some luxury companies are generating more revenue in other markets than in its home country. Similarly, the industry of a company is classified simply by its highest proportion of operating revenue. Such a classifying theme may lead to confusing results.

To sum up, demographic funds on average are operating similarly to the global economic trend. But some elite managers are outperforming the market by their demographic strategy. Since the funds using demographic strategy become more and more, this submarket will be more competitive and have a promising future.

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Appendix





The unique population dynamics of Switzerland

G. Pension systems: Discuss the Swiss AHV/IV and BVG systems in light of changing demography and provide three alternative systems. Discuss your options also within the context of the currently proposed solution by the Swiss Federal Council

- 1. The history of the three pillars system with its adaptations, threats from demographic changes, and unknown future**
Submitted by David Anliker
- 2. Other countries' approaches and implementation hurdles in Switzerland**
Submitted by Yann Meyer
- 3. The Swiss pension system in international comparison and conceivable reform proposals**
Submitted by Jonas Nussbaum

The Swiss pension system and its underlying political system - Quo vadis?

The history of the three pillars system with its adaptations, threats from demographic changes, and unknown future

Submitted by David Anliker

The Swiss pension with its three pillars, which we know today, was founded and added into the federal constitution in 1972. Since then, many heated debates over and revisions of the law happened. Society as a whole and its composition, goals, desires and wishes are constantly changing. That is why it is not surprising that there is a need for the pension system to be adapted and changed as well. But in the last couple of years it seemed as if adaptations of the system are getting harder and harder to achieve. How is this possible in Switzerland, which is known for its skill to find good compromises? But before the question of the origins of what seems like an adaptation blockage is discussed, it is important to take a look back at the development of the three pillars.

The first of the three pillars, which is mainly known for the *Alters- und Hinterlassenenversicherung* (or short: AHV) what can be translated to old-age and survivors' insurance, is actually a collection of four different insurances: The above-mentioned AHV, the IV (disability insurance), EL (needs-based benefits), and EO (Income compensation for service or maternity). Of those four insurances only the AHV is heavily affected by the demographic changes in Switzerland. Even though the IV has been struggling financially in the past few years, those problems can be traced back to other problems than demographic ones, like for example the rise of psychic stress. That is why from the first pillar only the AHV is going to be covered by this summary.

Before the foundation of the AHV the common thinking was that poverty was self-afflicted. It needed a change of thinking at the start of the 20. Century, to switch from needs-based benefits to benefits that are granted by the law. A pioneer and model for law granted benefits was the German Reich. Early in said century, the Swiss government planned to introduce state social insurances, but those plans encountered political resistance. So the system of social security stayed fragmented and heavily controlled by private actors up to the Second World War. In the year 1947, the Swiss accepted the new AHV law in a popular vote. The first pensions were already paid out in 1948, the financing was based on a pay-as-you-go system, so the contributions were

directly used for pensions. The retirement age was 65 years for both men and women. In the beginning, the pensions were kept modest, in order not to compete with the private pension at the time (AHV pensions ranged from 40 to 125 CHF per month). This cautious start of the first pillar is quite typical for the development of the pension system. In the first few years, the pensions alone couldn't guarantee a life above the poverty line. It took many years until, with the creation of the EL in the year 1960, a solution was found.

After a slow expansion of the pension payments over several years, the Swiss people were again asked to vote for or against a new system in 1972: the creation of the three pillars system. Simultaneously, the other option was to implement a full national pension. But the people chose the less extreme version, the three pillars system, because of their preference for private pensions over state pensions. This shows another typical attribute of the Swiss political system: Progress is often slow, because everyone can vote for or against every step.

Even though the above-mentioned vote cleared the way for the creation of a law regulating the second pillar, this so-called BVG law didn't become operative until 1985. In the time between the vote and the implementation the political forces shifted in Switzerland, which led to a much slimmer version of the BVG than promised. In contrast to the AHV, the BVG is based on funded financing. But the financing through proportionally allocated wage contributions stayed the same as with the AHV. The existing private pension funds kept running, but were put under legal regulations.

Together with the BVG, the third pillar was introduced. Due to the fact, that this pillar is just a voluntary private provision, it is commonly called just *pillar three*. It is again separated into pillar 3a and 3b. Pillar 3a is a restricted pension plan for people earning an income. Payments into this plan are tax-deductible up to a fixed amount – in 2018, the maximum is 6768 CHF. It is a restricted plan because it can only be withdrawn before reaching retirement age for selected reasons like buying or building a residential property or setting up one's own business. On the other side, pillar 3b is a free pension plan for everyone. It has no

limit to the amount you can pay into it and has no restrictions on the withdrawal but offers fewer tax advantages than the 3a pillar.

Now after this introduction into the three pillars, their history, and the political system in which they are embedded, demographic changes are discussed. Just like many other Western countries, Switzerland must deal with an ageing population. This trend can be traced back to the low birthrate and the rising life expectancy in Switzerland. At the time of the creation of the AHV, the birthrate was on a temporary peak, after it had been steadily shrinking in the previous decades. This temporary birthrate peak in the years after the Second World War up to roughly the middle of the sixties is commonly known as the *Baby Boomer generation*. At the vote about the pillars system in 1972 the birthrate was already shrinking again and at the time of the implementation of the law, the birthrate was almost at its all-time low and hasn't changed much since then. Of the three pillars, the AHV is struggling with the low birthrate much harder than the others. Probably the best indicator for this phenomenon is the old-age dependency ratio (OADR). This ratio is calculated by dividing the number of people older than 65 years by the 20 to 64-years old, multiplied by hundred.

Old-age dependency ratio

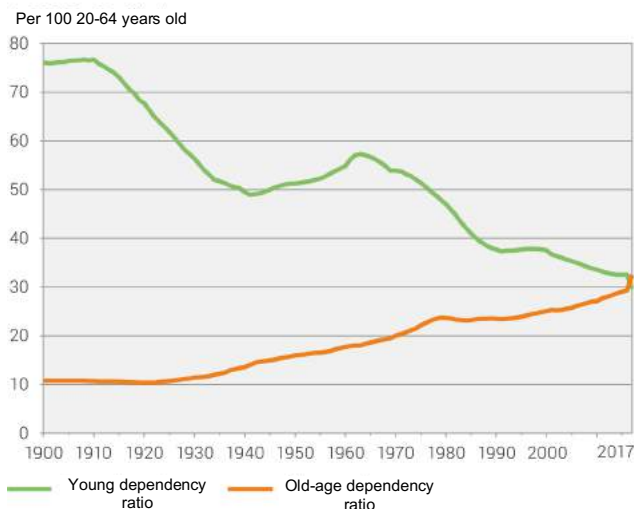


Figure 1: Old-age dependency ratio from 1900 to 2017

The OADR describes the total number of people depending, in this case the retirees, on hundred people in the workforce. By looking at historic data (Figure 1) it is evident that the ratio has been steadily growing from roughly 15 (1948) to just above 30 (2018) and it is expected to rise to 48 in the year 2045. In other words, the number of retirees per workforce member is growing without a limit in sight. This trend is gaining a lot of urgency if the ratio is turned around: How many workforce members are there per one retiree?

One of the fundamental ideas of the AHV is the *generation contract*: Young people are paying today the pension of the current retirees, in trust that their pension will be financed by young people of tomorrow. In the 1970s, there were 5 workers paying for one retiree, today almost 3.5 workers have to finance one retiree and future scenarios predict for the 2045 just 2 workers per one retiree.

With such an outlook it is not surprising that today's workforce is losing trust into the generation contract. To make things worse or, more likely, to undermine the mistrust, the capital of the AHV is expected to start shrinking in the year 2020 and is supposed to run out in 2030, if no countermeasures are taken. But what is the AHV capital? Although the AHV is a pay-as-you-go system, there is always a need for a certain amount of reserves in order not to get illiquid. These reserves are the AHV capital and are today worth roughly 40 Billion CHF, pretty much the size of the expenditure of one year. Of course there are quite simple solutions to let the revenue grow faster. The only problem with the current population development is that no adaption would be equally fair for every socioeconomic group. For example, if the percentage of contribution from the current working generation would be raised, it might be unfair if the working generation of tomorrow refuses to pay. Another often proposed solution is the raise of the VAT portion that goes straight into the AHV. Unfortunately, the retirees have to pay the increase in VAT as well, which leads in the end to an indirect cutback of the pension. Another compromise is needed to get the AHV back in balance.

Life expectancy at age 65

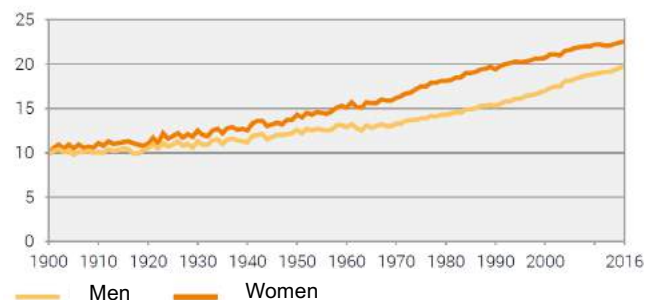


Figure 2: Life expectancy of 65-year olds from 1900 to 2016

Of course, the shifting age composition of the society with an increasing median age is not only based on the low birthrate. In the last 20 years, the life expectancy at birth increased from 79 to 83 years. Even more impact has the increase of the life expectancy of the 65-year olds: from 18.5 up to 21 years (Figure 2). This seems like a small absolute increase but is relatively

substantial with approximately 15%. In addition to providing more pensions, the government must provide those pensions 15% longer – and this only takes the last 20 years into consideration. This challenge of longevity doesn't only affect the AHV, the BVG is affected just as much.

As the life expectancy was already increasing at the implementation of the BVG, the parliamentarians decided to integrate a simple counter-measure, which allows for a quick and easy adaption to the current life expectancy: the *minimum conversion rate* (MCR). The MCR is the percentage of the accumulated savings at the retirement a retiree receives per year during his pension. The calculation of the MCR takes the life expectancy and the possible yield of the pension funds into consideration. At its introduction, the MCR was 7.2%, but was lowered over the years to 6.8% in the year 2014. Taking into consideration the current difficult situation of the bond market with zero or even negative interest rates, the MCR should decrease towards 6% to compensate this difficult economical time. So why isn't it just simply reduced? Even though one might live longer than the previous generation and will receive the same amount of money over the whole retirement, one would receive less money per year. Thanks to the direct democracy and the possibility of popular votes and referendums, a lower MCR is hard to implement. A look at the age composition of all voters makes things even worse: Today the median age of the voters is between 55 and 60 years and is even supposed to increase in the future (Figure 3). Simply put, half of all voters are in or shortly before their retirement.

Median age of different subgroups

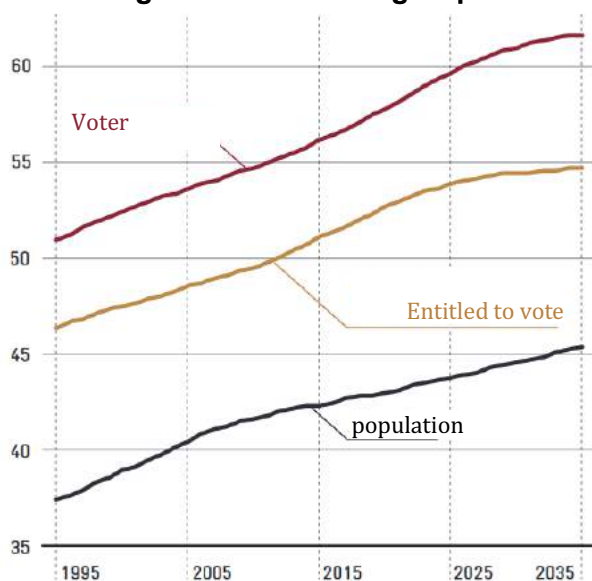


Figure 3: Median age of the population, entitled to vote and voters in the timeframe 1995 to 2035 (forecast)

Fortunately, these demographic challenges do not appear from one day to the other, rather their urgency grows from year to year, what gives politicians some time to come up with good solutions which would offer advantages for as many socioeconomical groups as possible. This long timeframe is much needed if failed adaptations of the first two pillars are analyzed: In 2004, the plan to increase the female retirement age from 64 to 65 and to increase the VAT portion that goes into the AHV was rejected with 67.9% votes against. In 2010, lowering of the MCR was rejected with 72.7% votes against in another popular vote. In the same year, a new attempt to increase the woman retirement age already died in the parliament. After those failures to change the system, politicians tried to find a compromise, that would be capable of winning a majority. Finally, in 2017, the reform *Altersvorsorge 2020* was presented: Of all the changes, the most important ones were the increase of the woman retirement age to 65 years, the enlargement of preponing and postponing options of the retirement, the increase of the VAT share that goes into the AHV by 0.6%, lowering the MCR to 6%, but adding 70 CHF to the AHV pension. This reform did distinguish itself from previous ones with the combining of the first and second pillar. After a so-called reform deadlock since the beginning of the millennium, many saw the urgent need for a reform. Not surprisingly this was also the most named reason to vote yes. Unfortunately this urgent need wasn't strong enough for everybody and the reform failed in its popular vote in the fall of 2017. A survey after the vote revealed a higher rejection from women and young voters, they saw themselves as losers of the reform. Having a more or less exact date on which the system will run out of funds probably did more damage than good. With still some time on the clock, the reform could have been rejected in the hope of the creation of a better option in the near future.

Such an option was developed by the parliament and is now getting fine-tuned. This new reform is called *AHV21* and only affects the first pillar. To keep the revenue and expenditure of the AHV in balance, the VAT should be increased by 1.5%, the woman retirement age increased to 65, and more options should be created for preponing and postponing the retirement. Unfortunately, this reform fails to fight long-time demographic changes and leaves the BVG untouched. But early surveys show a tendency towards rejection. But still some month will pass before a final vote will decide, and until then a lot can change.

So probably the demographic change isn't the biggest threat to the pension system, rather the

political system itself or more specific: the voters. Until the voters learn to accept the change instead of mourning the lost past, the future of the Swiss pension system remains in a state of limbo.

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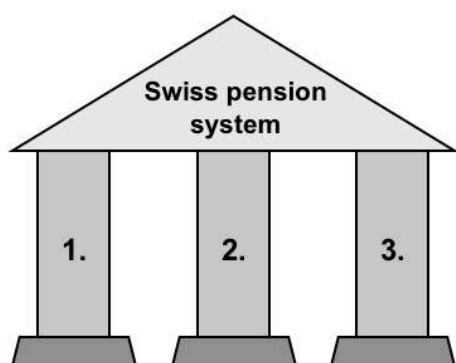
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Other countries' approaches and implementation hurdles in Switzerland

Submitted by Yann Meyer

It is difficult to implement changes to the pension system in Switzerland. In September 2017, the third pension reform in a row failed facing a democratic referendum (Bundesamt für Sozialversicherungen (BSV), 2017a). Nevertheless, the pension system in its current form will not be sustainable. This document aims to provide a short overview of the pension system in Switzerland, outlining the most significant factors that will challenge it in the future and presenting approaches of other nations' governments. Subsequently, possible solutions for Switzerland can be derived and discussed within the aspects of the Swiss pension reformation difficulties.

The Swiss pension system is organized in three pillars with different purposes. While the first pillar, AHV/IV/EL, targets the avoidance of poverty, the second pillar BVG aims at securing the living standard of the working inhabitants of Switzerland. Those two pillars combined should result in a rent of 60% of the last gross income of the pensioner (Schweizerische Bundeskanzlei, 2013). The first pillar is mainly financed through proportional income taxation of 5.125% in equal parts for the employer and the employee, added with funds of the government collected through a VAT-percentage point and further taxes (BSV, 2018).



Pillar 1

AHV / IV / EL

→ Mandatory state pension

Pillar 2

BVG

→ Occupational pension

Pillar 3

Bound & Free savings

→ Private, individual pension

Illustration based on Schweizerische Bundeskanzlei, 2013

Here, the payments of the working generations directly finance the rents of the current pensioners. In the second pillar, employed persons and their employers start from age 25 to pay 7% and later up to 18% of their wage into pension funds, which accumulate the wealth over time and pay out the rents based on the minimum conversion rate defined by the government (BSV, 2018). Currently, the minimum conversion rate is set at 6.8%, entailing a yearly rent of 6'800 CHF for 100'000 CHF of total payments throughout the working career. With the last pillar, 3a and 3b, Swiss residents have the option to put aside tax-deductible additional means for after their retirement. While deposits into 3a are limited and bound but tax-free up to a certain amount, payments into 3b have less tax advantages but are fully accessible before retirement (Schweizerische Bundeskanzlei, 2018a).

As a functioning pension system is one of the most crucial elements of any modern state, there are always multiple external and internal factors challenging and interfering its operations. For the pension system in Switzerland, the three central factors are the increased longevity, the low birthrate and the low interest rate environment. While 1990 the average life expectancy for Swiss men and women at birth was 74.0 and 80.8 years respectively, it rose until 2017 to 81.4 and 85.4 years (Bundesamt für Statistik (BFS), 2018). Other factors – wars, diseases etc. – unchanged, the life expectancy will continue to rise steadily over the next decades, implying that within the current system more pensioners will receive payouts for longer time periods. At the same time, the birthrate stagnates at approximately 1.5 children per woman since 1970, with no change of trend in sight (BFS, 2015). Due to this low birth rate, less people are entering the work force that finances the rents of the pensioners. This impacts the AHV directly as it operates on a pay as you go system and less workers are financing more pensioners. The old age dependency ratio (OADR), which measures the amount of contributors per pensioner is expected to drop from 3.45 in 2015 to 2.08 in 2045 (BFS, 2018). It effects the BVG indirectly as less payments are made to the pension funds and the minimum conversion rate is currently with 6.8% set too high, implying pensioners are receiving more means than they contributed during their career (Rupp & Kull, 2012, pp. 239–240). As the BVG is operating on a

capital covered basis, in which the wealth gets accumulated over time through capital investments, it is also dependent on the performance of the financial markets. Due to the currently low interest level environment (Schweizerische Nationalbank, 2018), the pension funds are not able to accumulate much additional funds. All these factors combined exert a severe pressure on the current Swiss pension system. Already in 2030, the AHV alone is forecasted to operate under a yearly deficit of 7.6 billion CHF, rapidly growing to 13.7 billion CHF by 2035 (BSV, 2017b). This implies an extensive redistribution of wealth from the younger to the older generations and represents a large potential conflict area for the Swiss society in the future.

Switzerland is certainly not the only state facing these problems, as those effects are operating in many developed countries across the world. Therefore, when tackling these issues, it is valuable to take into account the pension systems and the solution approaches of other nations. To select countries with a “good” pension system, various factors can be considered and weighted against each other. Two factors with high significance are the sustainability of the pension system and the ability of the pension system to provide adequate payments to its pensioners. When ranking the pension systems of different nations according to these factors, the countries Denmark and Netherlands have best-in-class pension systems (Allianz SE, 2016). Thus, their pension systems and measurements taken will be outlined and discussed in light of the Swiss system in the following.

Denmark’s pension system operates on a three-pillar system, with goals of the different pillars being mostly congruent to the goals of the Swiss system. The Danish system aims at a 70% net income replacement rate, which – due to the lower divisor in the calculation – is similar to the 60% gross income replacement rate of Switzerland. On the first hand, a state pension is integrated in the first pillar of Denmark, which is composed of a basic pension, a means tested supplement for persons whose income and capital are below certain levels and additional supplements (World Economic Forum (WEF), 2017, p. 15). This system, which operates on a pay as you go basis, strongly resembles the first pillar AHV/IV/EL of Switzerland. On the other hand, Denmark’s first pillar knows a Labour Market Supplementary Pension Scheme (ATP), where employees and employers contribute a fixed amount only slightly varied against the number of hours worked per month and as pensioners, the former employees receive a steady flow of

annuity payments (World Economic Forum (WEF), 2017, p. 15–17). Switzerland does not know such a fixed contributions and payout system. If required, Swiss residents individually need to attain such coverage on the insurance market. The second pillar in the Danish system is the labour market pension, built on collective agreements of employee representatives with employers. Contributions are based on the income and range between 12% and 18% (WEF, 2017, p. 15), thus being weighted similarly to the 7% to 18% BVG-contributions in Switzerland. Today, Denmark has a retirement age of 65 for both men and women. To enhance the sustainability of the pension system, Denmark raises the pension age to 67 until 2022, 68 until 2030 and then ultimately links it directly to life expectancy of Danish citizens (Organization for Economic Cooperation and Development (OECD), 2017, p. 1). The elimination of direct politics-involvement will allow timely adjustments to the pension age and remove the possibility of political maneuvers. This element differs largely from the Swiss pension system, in which even a planned alignment of men and women’s retirement age to 65 years was entailed by broad controversial discussions and was finally rejected in a democratic referendum (BSV, 2017a).

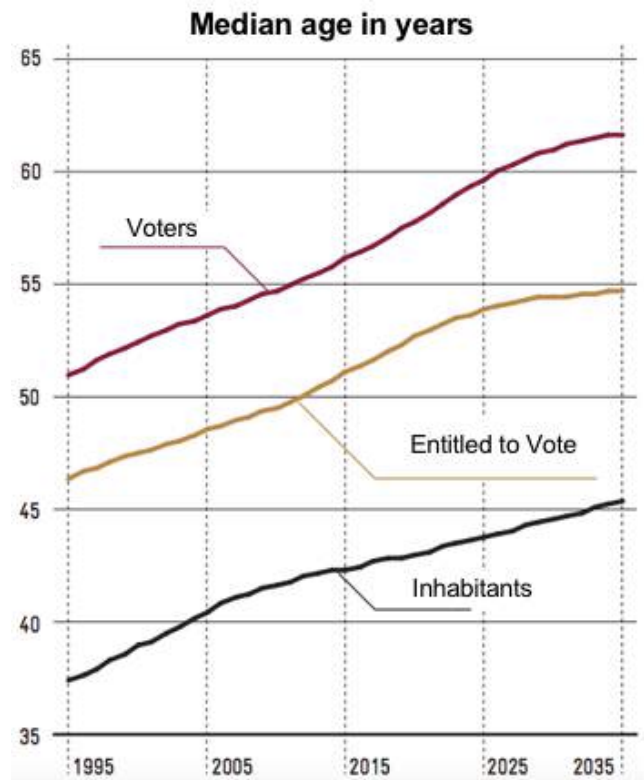
The other “best-in class” nation, the Netherlands, also implemented a three-pillar pension system. The first pillar is the State / AOW pension for all Dutch residents. (WEF, 2017, p. 29). In contrary to the AHV in Switzerland with payments ranging from 1’175 CHF to 2’350 CHF (Schweizerische Bundeskanzlei, 2018b), it is a flat-rate scheme with equal gross payments of 1’181 EUR to all retired residents with the maximum contribution period of 50 years; 814.74 EUR for married couples or people living with a partner (Sociale Verzekeringsbank, 2018). The rent payments in the first pillar are linked to the minimum wage and the subsistence level, continuously ensuring adequate payments to the pensioners – as a direct impact, the Netherlands has a very low old-age poverty rate (OECD, 2017). The rent is financed by 100% of the current working generation with no contributions of the employers. The contribution is currently set at 18% of the income, which makes the first pillar in comparison to Switzerland with 10.25% (5.125% employees and 5.125% employers) very expensive for Dutch workers (WEF, 2017, p. 29). This in turn leads to a larger redistribution of wealth through the pension system, as workers with high wages proportionally contribute more funds to the system and are nevertheless receiving a flat-rate pension after retirement. Pillar 2 of the Dutch pension system consists of collective occupational pension

funds. The contributions are 20% to 25% of the income and 2/3 of them are born by the employer, 1/3 by the employee (WEF, 2017, p. 29). In this aspect too, the contribution rates are higher than the 7% to 18% BVG rates in Switzerland. The enlarged extend of the Dutch pension system can ultimately be determined by the 70% to 75% target gross income replacement rate, which should be achieved by combining Pillar 1 and 2 (WEF, 2017, p. 29). This target replacement rate is with 10 to 15 percentage points difference significantly higher than its Swiss counterpart and more expensive for the current Dutch working generation. Nevertheless, the Netherlands took counter measures to relieve demographic pressure from the system. From today 65.5 years, the retirement age will be raised to 67 years in 2021, and from then it already will be linked to life expectancy (OECD, 2017). This rapid increase of the retirement age may increase the conflict potential and may result in protests from the soon to be retired generation, but shortens the timeframe of politics-involvement and restricts their ability to implement changes.

Both systems scoring well in the dimensions “sustainability” and “adequate payments to pensioners” have many similarities to the Swiss pension system. While Switzerland itself is strong on the “adequate payments to pensioners” rating, its pension system was not perceived as very sustainable (Allianz SE, 2016). Therefore, when attempting to improve the current pension system, the largest lever certainly lies in enhancing its sustainability. Thus, the most relevant attribute setting Denmark and the Netherlands apart of Switzerland is their ability to relieve the system from one of the challenging developments discussed at the beginning: Longevity. The establishment of an automatism in adjusting the retirement age results in a fairer and more adaptable system than leaving the decision to the government or parliament – the present situation in Switzerland is in this matter a very suitable example. The Swiss parliament proposed to connect two topics with no significant intrinsic match, an AHV reform together with an enterprise tax reform. Middle-right parties value law certainty for the enterprises as very urgent, while left-wing parties aim at more funding for the AHV, which also in Switzerland functions partly as an income redistribution measure (Forster, 2018). While not tackling central problems such as a rising OADR or an inadequate minimum conversion rate, the proposed solution mainly grants the AHV additional funding, enabling the AHV to write black figures until approximately 2024 (Tagesanzeiger, 2018). Leaving room in a pension system for

political maneuvers may therefore substantially delay or even prevent necessary changes from being implemented.

In a democratic system, in which the population due to a low birthrate and an increasing lifespan is rapidly ageing, the average voter is getting older and closer to his retirement age. Especially considering, that the participation in votes rises steadily by age and reaches the highest level at age 71 in Switzerland (Avenir Suisse, 2015).



Graph of Avenir Suisse, 2015

Thus, already today, Swiss votes are dominated by old people. 1995, the median voter’s age was 52, which raised to age 56 in 2015. As this trend is expected to continue, the median voter is about to reach 62 years in 2035. (Avenir Suisse, 2015). It may thus become highly difficult to implement reductions in the pension services or introduce a higher retirement age, underlining the importance of a timely reaction to keep the pension system sustainable and to prevent deep generational conflicts. The solution of the Swiss parliament, which delays the problem for an additional approximately six years, is not expedient and will only increase the urgency to act – facing older voters which will be directly affected by changes.

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The Swiss pension system in international comparison and conceivable reform proposals

Submitted by Jonas Nussbaum

After the financial crisis of 2008, which has put a heavy strain on public finances in many countries, pension reforms around the world have returned to the top of the political agenda. Nonetheless, the resulting financial difficulties are not the only factor threatening the future of today's pension systems. In particular, the two arguably most important demographic indicators (birth rate and life expectancy) and their future development are a cause for concern in an increasing number of countries:

In Switzerland, for example, the birth rate has been stagnant since 1975 at 1.5 children per woman and is not expected to rise significantly in the next decades. On the other hand, life expectancy is rising steadily and in 2017, it reached a level of 85.4 years for women and 81.4 years for men. This development has and will drastically change the composition of society and is reflected by the old-age dependency ratio: While nowadays slightly more than three depositors have to pay for a pensioner in Switzerland, this ratio will fall to nearly two people by 2045. The steadily growing number of pensioners, as well as the constantly decreasing number of contributors leads to the question: "How should the AHV be financed in the future?"

However, this is not a structural problem that affects only the industrialized countries. Numerous countries around the globe are currently in the same situation, including demographic heavyweights such as China or Brazil. To better evaluate the current state of the Swiss pension system, an international comparison would, therefore, be desirable.

In general, a comparison between different pension systems proves to be difficult. This is because every country has different pension institutions and legal frameworks. Nevertheless, Allianz Insurance has managed to identify two key characteristics that make various pension systems comparable. First, the **financial sustainability**, which measures the system's ability to provide pension payments over the long run and also serves as an indicator for a country's need to undertake and implement reforms. And

secondly, the **income adequacy**, which describes a system's ability to provide an adequate retirement income for future pensioners. To compare these two characteristics of international pension systems, Allianz Insurance developed the following two indices. The financial sustainability of a system is measured by the Pension Sustainability Index and the adequacy of the pension income by the Retirement Income Adequacy Index. What these two indices consist of and how they were formed is discussed in the following paragraphs:

The **Pension Sustainability Index (PSI)** of 2016 used a systematic approach to evaluate the financial sustainability of 54 countries over the long-term. For this purpose, a number of indicators - such as *demographics*, *public finances*, and the *design of the pension system* - were examined on the basis of various present and future parameters. The individual parameters of the indicators were rated by a score of 1 to 10 and mathematically weighted afterward. The weighting for today's parameters was 0.75, while future parameters were weighted at 0.25.

As shown in Figure 1, the indicator *demographics* only takes today's old-age dependency ratio and its development until 2050 into account. Or in other words, the above-mentioned indicator examines the ratio of contributing persons to retirees, as well as the future development of this relationship. It is important to note that even though population aging is a worldwide phenomenon, the dynamic and speed can heavily differ from one country to another. By assessing today's OADR and that of 2050, the PSI takes the different speed and dynamics of the population aging process into account.

In contrast, the indicator *design of the pension system* relies on various parameters. First of all, it assesses the level of pension benefits from the first pillar and its expected change in the future by rating the replacement rate¹. In this way, the generosity of the system can be measured. But a low replacement rate does not automatically result in a poor score in this indicator. This is only the case when there are no additional funded

¹ The replacement rate determines the percentage of a depositor's pre-retirement income that is ultimately paid out during retirement.

systems² that can balance the low replacement rate. To take this effect into account, the experimenter included the following parameter: strength of the funded pillar and reserve fund, measured by assets in percentage of GDP. Another important factor is the coverage of the workforce. A high score in this parameter was only awarded if large parts of the workforce are enrolled in a pension plan. While this seems to be self-evident in Europe, in some countries only a fraction of the working population is part of such a system. Two prime examples for extremely low coverage of the workforce are, for instance, China and Thailand. Furthermore, the indicator *design of the pension system* also considers the legal and effective retirement age, as well as the reforming progress of the system. The retirement age of the various pension schemes has been compared since it is a crucial factor in financing. This is especially the case for Pay-As-You-Go (PAYG) systems³. The distinction between legal and effective retirement age is necessary as many countries have introduced early-retirement options. These small age deviations often already have a major impact on the financial condition of the system. As already mentioned, the last parameter that was considered in this indicator is the reform progress. For this parameter, the study focused on reforms that have already been approved but not yet implemented. This also explains why this parameter was listed in Figure 1 under dynamics and thus belongs to the future-oriented parameters.

The last indicator that influences PSI is *public finances*. The study of this indicator is based on a) the pension expenditures as a percentage of GDP as well as its expected change until 2050 b) general government debt as a percentage of GDP and c) welfare support. Above all, the first-mentioned parameter is intended to measure how much the publicly managed part of the pension system affects public finances and how this will develop in the future.

On the other hand, the general government debt as a percentage of GDP is used in the PSI to give an indication on how much the public finances can be stretched. This is due to the fact that public debt in some countries has exploded in recent years, leaving little room for additional pension expenditures. Finally, the welfare support parameter measures the number of pensioners who depend on supplementary benefits in order not to

fall below the poverty line. These expenditures are therefore another factor that weighs on the public finance indicator and is thus also considered in the PSI.

The **Retirement Adequacy Index (RIA)**, introduced by Allianz Insurance, analyzes the future income sources of a pensioner and compares them to future expected expenditures. Through this approach, the 49 surveyed countries can be ranked on the basis of their ability to provide adequate retirement income for future pensioners. However, the definition of what an adequate income is varies from country to country. While some systems focus on keeping the population above the poverty line, Western pension systems are more likely to focus on a fixed percentage of their paid-in income or maintaining the standards of living. In general, pension schemes that finance pension income evenly across the three pillars are ranked best in this index. These systems can in all likelihood provide a decent retirement income. Following the introduction of the two indices, the next paragraph looks at how the Swiss pension system ranked in these two indices in international comparison.

Switzerland has deteriorated compared to 2014 in the PSI and is currently ranked 13th out of 54 countries (figure 2). This is, in particular, due to the fact that the population projections of the UN have worsened in the last two years. In addition, it is expected that the ratio between pension expenditure and GDP will continue to deteriorate in the future and thus will increasingly burden public finances. Nonetheless, Switzerland scores relatively well in the PSI compared to its peers. This is because Switzerland has a relatively low level of general government debt compared to GDP, a relatively high effective retirement age and a good coverage ratio of the workforce. Thus, in summary, it can be said that the pension payments are not at risk in the short term. Demographic change and the increasing burden of public finances, however, jeopardize the long-term sustainability of the system and will, sooner or later, necessitate a reform. On the other hand, the Swiss pension system is one of the best in the world in terms of income adequacy (4th place). Thus, the Swiss pension system can with reasonable certainty provide a decent retirement income for future retirees. However, it becomes increasingly interesting when the two indices are considered together, as can be seen in Figure 3.

² A funded pension system is a system with enough available funds to pay all future retirement benefit claims.

³ Pay-As-You-Go systems are characterized by the fact that today's workers pay for the pension payments of the current pensioners (as for example in Switzerland).

There are very few countries that perform well in terms of both financial sustainability and income adequacy. Three systems that succeeded in doing so and ranked among the top five in both dimensions are the pension systems of Denmark, Norway, and the Netherlands. Most countries only achieve a good ranking in one of the two dimensions. For example, Japan, which provides a decent retirement income, but scores very poorly in financial sustainability. The Swiss system, however, belongs to the extended circle of best pension schemes, as the red rectangle in Figure 3 shows. Nonetheless, PSI indicates the need for a reform in order to ensure the long-term sustainability of the system. The solution approaches discussed repeatedly in Switzerland are presented in the following.

Basically, there are three possible approaches to reform in today's Swiss pension system: Firstly, the creation of additional income for the system. Secondly, a reduction in pension payments. And finally, an improvement in the ratio between contributors and retirees.

In order to increase the revenues of the system, it is often proposed to enhance the wage contributions or to add further tax money to the system. In particular, increases in inheritance tax, gift tax or VAT in favor of the pension system are being discussed. However, such measures make consumption more expensive and/or burden the working population with an additional redistribution from young to old.

On the other hand, the simplest way to reduce system expenses would presumably be to lower pension payments for new retirees or even all recipients. Another conceivable measure could lower expenditures by abolishing the mechanism for adjusting minimum pensions to real wages. Nevertheless, also this approach has its downsides. By reducing the pension payments, more retirees will be dependent on supplementary benefits. Thus, old-age poverty is increasingly becoming an issue.

Last but not least, there is the approach of improving the ratio between contributors and recipients. Compared to the previous two approaches, it has the advantage of being the only one tackling the structural population problem of low birth rates and ever-increasing life expectancy. Possible proposals in this context would be, for instance, easing migration policies or increasing birth rates by introducing further incentives for families. However, it seems questionable in the current party structure if a more liberal migration policy would be politically enforceable. On the other hand, increasing the birth rate through

additional incentives for families raises the questions of whether it even would be worthwhile from a financial point-of-view. Other conceivable solutions focus more on adjusting the retirement age. There are various proposals for doing this: From an adjustment of the retirement age of women to a fixed number of payment years and thus the abolition of a fixed retirement age - everything has already been the subject of intense debate. Nevertheless, the excellent rankings of the Danish, Dutch, and Norwegian pension systems in the aforementioned indices suggest that an adjustment of the retirement age depending on life expectancy would also be a reasonable measure in Switzerland.

However, so far none of the described solutions has prevailed in Parliament. Therefore, to convince the majority of Parliament and population, the 11th AHV revision will probably have to combine different approaches. In my opinion, it is important to understand that future reforms must address the structural problem across generations. Otherwise, the problem is only being postponed into the future at the expense of the following generations. After all, it is and stays a problem that ultimately affects us all. Therefore, it should be resolved by a solution that does not unduly burden any population group.

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Figures

Sub-indicators	Status (0.75)**	Dynamics (0.25)**
Demographics	Old-age dependency ratio (OAD)*	Change in OAD* until 2050
Pension system	Level of pension benefit from 1st pillar and coverage of workforce	Change in level of pension benefit
	Legal / effective retirement age	
	Strength of funded pillar and reserve fund (as % of GDP)	Reforms passed
Public finances	Pension payments / GDP	Change of pension payments / GDP until 2050
	Public indebtedness / GDP	
	Need for welfare support	

Figure 1: Main indicators of the PSI with the associated parameters

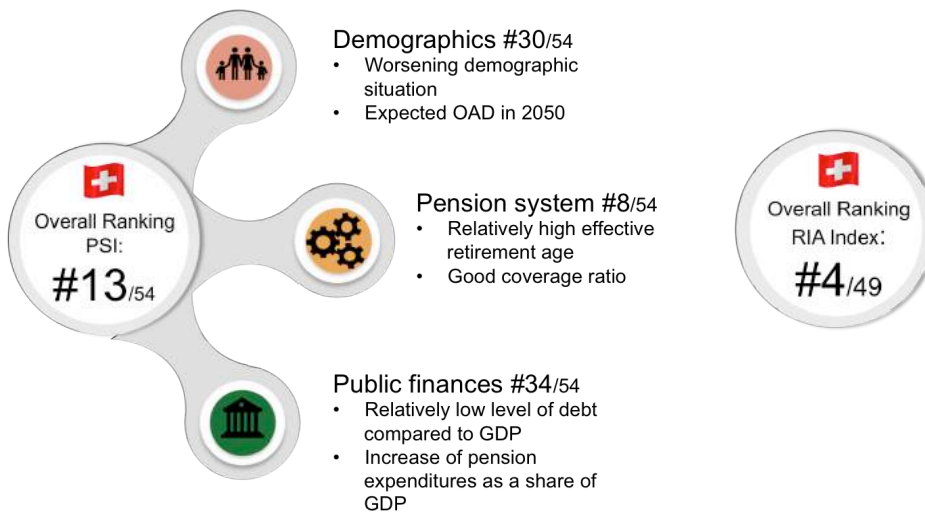


Figure 2: The Swiss ranking in the PSI / RIA in an international comparison

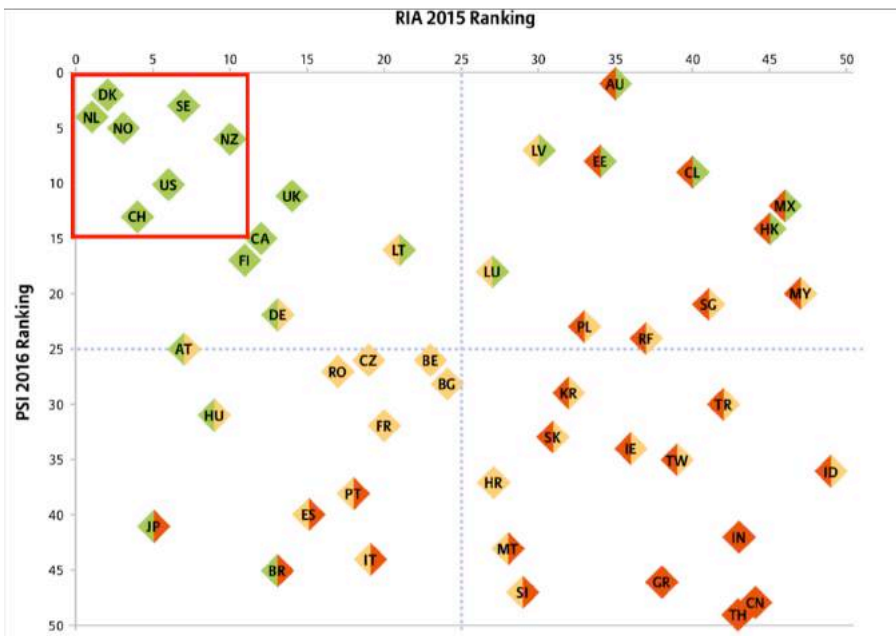


Figure 3: Comparison of financial sustainability and income adequacy of pension systems around the world

III. NEW BOOK PUBLISHED BY THE LECTURER

Failure is not an Option - How Africa can capture its Demographic Dividend, and why is this so important?

On June 21, 2017, Hans Groth from the World Demographic & Ageing Forum in St. Gallen, Switzerland, and John F. May from the Population Reference Bureau in Washington, D.C., USA, have published their book named "Africa's Population: In Search of a Demographic Dividend". The book analyzes how Africa can accelerate its economic growth by benefitting from its changing population structure. It includes contributions from renowned African and international scholars and is expected to become a reference work for international opinion leaders, policymakers, and strategic planners.

There is no doubt: Africa will dominate global population dynamics in the 21st century. While public attention is still focused on Asia as a fast-growing and prospering market with currently 4.5 billion inhabitants, today's one billion sub-Saharan Africans have significantly outpaced Asia in terms of population growth (2.6% vs. 1.1% in 2016, respectively).

The main reason for this ongoing population growth in sub-Saharan Africa (SSA) is a sharp decline in infant and child mortality while birth rates have been high for years (the fertility rate per woman was 5.1 in 2013 compared to 6.7 in 1970), while infant mortality declined rapidly from 138 deaths per thousand births in 1970 to 67 in 2013. Today, one billion people or 16% of the world population live in SSA. By 2050, they will double and in 2100, 3.9 billion people or 39% of the world population could live in the region. This is the official forecast according to the Medium variant of the 2015 United Nations Population Projections.

A key issue today is the formulation of policies that would help Africa to replicate the conditions that have enabled East Asian countries to prosper and capture a "demographic dividend" (DD) during the period covering the early 1960s to the 1990s. The DD is defined as an accelerated economic growth triggered by the decline in a country's birth and death rates and the relative increase in working-age adults. However, to open this demographic window of opportunity, public policies will need to manage a rapid and significant decline in fertility in order to reduce the number of young dependents.

With the objective of enhancing the much-needed discussion on the demographic dividend in Africa, Dr. Hans Groth of the *World Demographic & Ageing Forum* (WDA Forum), a Switzerland-based think-tank has joined forces with John F. May from the *Population Reference Bureau* (PRB) in Washington, D.C., a world leader in demographic data packaging and dissemination. The outcome of this collaboration is a comprehensive book named "Africa's Population: In Search of a Demographic Dividend", which is based on up-to-date research on Africa's population dynamics. Fifty renowned scholars, many of them African – have contributed to this book, which has been published on June 21, 2017.

The book's key conclusions are:

- **Africans urgently need jobs.** There will be no demographic dividend without new jobs. According to the International Monetary Fund (IMF), 18 million new jobs are needed every year till 2050. For just one year, this is equivalent to the population of the Netherlands. From now until 2050, the new jobs required are almost equivalent to the entire European population. The prerequisites to achieve this are education and training, followed by investment based on trustworthy conditions.
- **Africa needs continued health investment and improvement.** The window of opportunity for a demographic dividend only appears when fertility declines significantly and rapidly. This depends on further improvements of women's and children's rights and health outcomes. Making sure that women meet their reproductive health needs is a key priority.
- **Failure is not an option. A bad outcome would challenge both Africa and the global community.** Not succeeding in capturing a demographic dividend in Africa would lead to millions of people living in poverty and in slums. It would result in a restless young population and facilitate human suffering and social disruptions that could spill over well beyond Africa.

"Africa's Population: In Search of a Demographic Dividend" is expected to become an internationally recognized reference work for leaders, scholars, policymakers, and business planners.

John May is visiting scholar at the Population Reference Bureau, Washington DC.

Hans Groth is chairman of the board at the World Demographic & Ageing Forum, St Gallen. They recently published the book 'Africa's Population: In Search of a Demographic Dividend' (Springer, 2017)

Reference of the Book

Hans Groth & John F. May "Africa's Population: In Search of a Demographic Dividend", Dordrecht: Springer Publishers, 2017 (ISBN 978-3-319-46887-7). See also: <http://www.springer.com/us/book/9783319468877>

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