WDA Forum

University of St.Gallen

Project Papers 2016

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
Fall 2016

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I. FOREWORD

Demographic change, ageing, retirement age, pension system performance – topics like these are omnipresent nowadays. The World Demographic & Ageing Forum (WDA Forum), a foundation established in St. Gallen in 2003 has for many years been a platform to enable dialogue, research, develop positions and generate understanding across generations and societies, both nationally in Switzerland and internationally.

In recognition of the complex nature of the topics ageing and demography, the WDA Forum is conducting a series of activities to ensure better understanding and the promotion of new viewpoints and innovative ideas. The respective master course offered at the University of St. Gallen is one of these activities. No social science study track can be pursued isolated from the parameters around ageing as they cut across almost all of study objects in one way or another. It is important to promote a scientific evaluation of inherent issues and subsequently the critical evaluation and constructive discussion of facts, proposals and theories. The paradigm shifts to be expected will challenge our world in a way never seen before. Resulting population movements, rising healthcare cost, retirement financing, behavioral impact within cohorts emerging and voicing their expectations will lead to challenging conflicts. Promoting concepts to deal with the issues at hand requires mastering tools, the analytic processing of information and an open but critical mind.

The papers included herein are the result of a Master class taught by Dr. Hans Groth during the 2016 fall semester. They represent an example of the range and the scope dealt with as much as they provide an indication of the approach taken to deal with the subject chosen. Each paper, while not at the same level as a thesis, has to meet formal and scientific standards. All papers were developed in a course held under the supervision of Dr. Hans Groth. The program also includes discussion, debate and presentation by experts in the field. The papers are shedding light on various aspects of demography, such as summarizing status and prospects of regions or countries, a critical evaluation of concepts, characteristics of change and dynamics, all seeking to contribute a constructive perspective, a critical assessment or plain analytical overview.

Such a paper, submitted by a team of students, is assessed by the reviewing professor and challenged by all students embarked in this class.

My gratitude goes to the University of St. Gallen, who understands the relevance of such an important master program; to Regina Regenass from the WDA Forum for coordinating everything behind the scenes and of course Dr. Hans Groth for the cooperation and the exchange that led to this publication.

I am of course particularly grateful that the compilation of this years' papers as a publication was made possible by the support of the Galenica group. The Galenica group has supported

the WDA Forum for some time based on the conviction that the subject of ageing is of utmost importance particularly in healthcare and that the discussion is either not getting proper attention or is not anchored sufficiently on facts but rather often on preconceptions, interests, and existing frameworks. Galenica is proud to participate in the work of the WDA Forum and is also proud to support the endeavors of students in this field. Galenica has high hopes that all this may be a small but important step, helping to develop solutions, prioritize activities, engage in dialogue and fundamentally provide services needed in tomorrow's health-care world.

Enjoy the reading and do get back to the WDA forum if you have comments and insights.

We have just started the first steps of a long journey – a journey of longevity and what it means to our life, our societies and the balance of our social systems.

Dr. iur. Christian Köpe
President WDA Forum
Executive Director, Galenica AG, Berne

II. INTRODUCTION AND RATIONALE

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 trends in the 21st century and their impact on business & society.

The case studies elaborated each year by the students focus upon four categories:

- Demography and geopolitics across the globe
- Natural resources
- Demography and business & society
- Demographic challenges in Switzerland

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

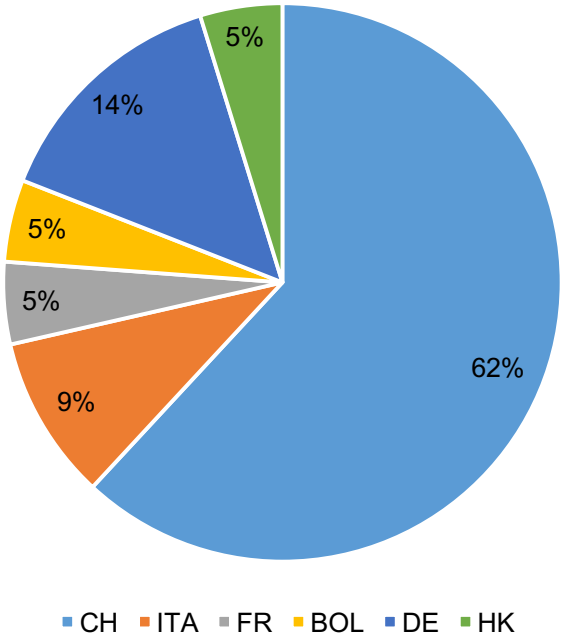
The coming decades will expose us to demographic dynamics that history has not equipped us to manage/to cope with. It forces us to focus on the future, a period of time which we are not accustomed to reflect upon. This is why the megatrend of demographic change is so intimidating and makes it all the 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 challenge.

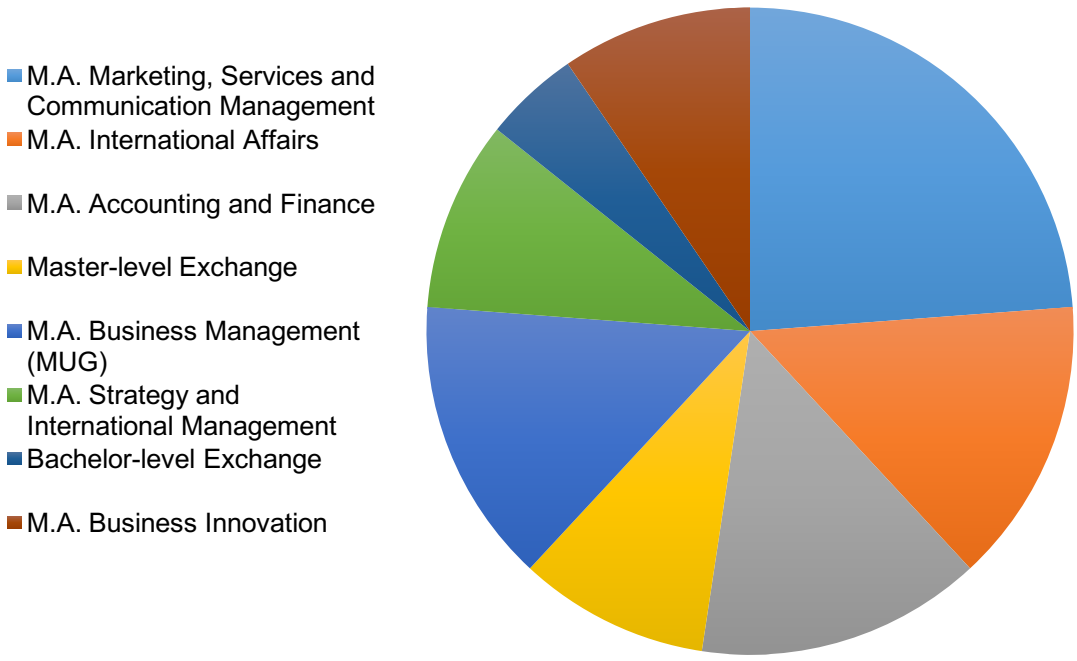
My response as a member of the 60+ generation is to provide a unique platform for academic thinking and exchange for HSG students who want to broaden the scope of their education in terms of demography and its impact on business, governance and society – both as managers and as responsible members in the communities they are living in.

In this year's autumn semester 21 students from 6 different nations (France, Bolivia, Germany, Hong Kong, Italy, Switzerland) and from 8 different HSG Programs (SIM, MIA, MaccFin, MSC, MBI, MUG, Master Exchange, Bachelor Exchange) successfully bid for my class.

Nationality Distribution



Educational Background



It is obvious that such a unique group represented inspiring cultural and academic diversity. The students aligned themselves in 7 project groups and engaged in one of the following subjects:

- **Demography and geopolitics across the globe**
  - Africa's demographic history and future to 2050
  - Draw a demographic picture of Cambodia to 2035
  - China's new one child generation: What are preferences and social and economic behaviour patterns?
- **Natural resources**
  - How will demography influence demand for energy in terms of quantities and qualities?
- **Demography and business & society**
  - Gender equality: How does this impact the fertility rate?
- **Demographic challenges in Switzerland**
  - Shrinking working age population in Switzerland: Strategic recommendations to mitigate labor force shortages in the healthcare industry – an industry characterized by limited resources and growing demand due to ageing/longevity.
  - Build your 100 year life in Switzerland – How will Regula (28 yrs) and Urs (32 yrs) be working and living in an age of longevity?

In this book, you will find the corresponding papers which were elaborated by these 7 working groups in November 2016. Prior to submission all papers have been presented and vividly discussed in class.

I am convinced that the 2016 papers of my students will be an extremely inspiring source on how our "Planet Earth" might develop. One might also agree that these students have developed 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 21 students who contributed to the content of this book, 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, April 2017

III. PAPERS OF THE 2016 MASTER CLASS

Contents

Country & regional case studies all across the globe

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Opportunities arising from demography for business & society

E. Gender equality: How does this impact the fertility rate?

The unique population dynamics of Switzerland

F. Shrinking working age population in Switzerland: Strategic recommendations to mitigate labor force shortages in the healthcare industry – an industry characterized by limited resources and growing demand due to ageing/longevity.
G. Build your 100 year life in Switzerland – How will Regula (28 yrs) and Urs (32 yrs) be working and living in an age of longevity?

Country & regional case studies

A. Africa's Demographic History and Future to 2050 Harvesting the demographic dividend

by Nga Lai Wong, Moritz Vohler, Tim Zurfluh

This paper analyses the historic and future demographic change of the African continent until the year 2050. To do so a holistic perspective has been chosen to assess the impact that the demographic change has on politics, economy, society, technology, environment and legal developments. In general, Africa is characterised as a continent with high population growth due to fast decreasing mortality rate, combined with slower decreasing fertility rate and longevity. Additionally, a shift in the age distribution with increasingly young people and a growing middle class triggers the following opportunities as well as challenges.

Political institutions need to enable growth, which can only be achieved when governments show stability and crisis such as civil wars, terrorism and violence are mitigated. Therefore, the ongoing democratization is a sustainable trend that is expected to continue. The economy shows constant growth but this is mainly driven through foreign investors and contemporary projects. For long term development, job creation and improvement of education is crucial. The society itself is very diverse but still shows segregation between men and women in terms of rights, education and job opportunities. The Sub-Saharan Africa region has the lowest electricity connection worldwide with increasing demand, which results in an important challenge: attract foreign investors for growth in the sector and thereby achieve the shift towards the generation of renewable energies. Meanwhile the telecommunication sector increases with higher demand for smartphones and thereby increasing the internet penetration rate. The effects of global climate change affect Africa mainly through the loss of agricultural area for income, food scarcity and higher necessity to flee from home regions. Just to adopt to environmental changes will be a huge cost factor for the local inhabitants and governments. The legal and regulatory framework enables the successful exploitation of opportunities through mitigation of corruption, setting up strong governmental institutions and building a legal framework to attract foreign investors.

To conclude, a strong economic growth is given to affect demographic change, but is not sustainable. Therefore, education and gender equality is needed, which could be enabled through a legal framework and strong political institutions. The climate change and thereby the environmental risks increase, while technologies enable those changes to become areas of growth in the future especially through energy production and telecommunication.

Recommendations on how to use opportunities and mitigate risks include the building up of better institutions, restructuring the manufacturing and agricultural sector through the use of

new technology and to improve infrastructure. This should enable better living conditions especially for females. Trends such as urbanization need to be included into regional integration activities between countries and enable investments from foreign investors. These investments should help to adopt to the changing environment, the shift towards renewable energy production and at the same time create jobs for the growing working population.

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LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
GDP	Gross Domestic Product
MYS	Mean Years of Schooling
IMR	Infant Mortality Rates
SSA	Sub-Saharan Africa
TFR	Total Fertility Rate
UN	United Nations

1. INTRODUCTION

"The future will be built in Africa." said Mark Zuckerberg, the CEO of Facebook, who made his first Africa trip recently (Shapshak, 2016). It is not hard for the world to notice that Africa, the world's second-largest and second most-populous continent, is changing fast. The change in demographics of Africa is marked by the rapid growth of population due to decline in child mortality and slow decline of fertility rates. According to the estimation of the United Nations, the population of Africa might reach 2.5 billion by 2050, that is equivalent to 26% of the world's total population (University of Texas, 2015). A large youth "bulge" population is produced and there will be a smaller number of dependents.

With such changes in demography, Africa faces uncertainties on how the continent will look like in 2050. Will there be enough schools, health institutions or food for the growing portion of the younger generation in Africa? Will the continent have the ability to offer enough labour opportunities for the large expansion of the younger population into working-age? Can the poverty problem in Africa be alleviated, or at least mitigated? Will the population be able to reap a demographic dividend from the growth to propel an economic take-off? Whether these uncertainties will turn into threats or valuable opportunities depends much on how these challenges will be handled.

The purpose of this paper is to analyse the demographic change in Africa. First, a demographic outlook of Africa in 2050 (34 years from now) will be examined based on the current situation and development trends. Then, this paper goes further to explore various implications of demographic change on African politics, economy, society, technology, environment, law and regulations, as well as how the changes and the factors interact with each other. Based on the data and trends shown in the analysis of this paper, recommendations on how to effectively and efficiently deal with the challenge of demographic change will be given at the end.

Demographic transition varies greatly across Africa in pace and path. To illustrate different developments across regions, at some point looking at different areas such as Northern Africa, Western Africa, Central Africa, Eastern Africa and Southern Africa might be useful. Nevertheless, Sub-Saharan Africa is commonly used and consists of all African countries that are fully or partially located south of the Sahara. Economical, societal, political and legal development levels differ across the continent. They also develop at different rates and different extent. Although the task of generalizing the trends for the whole continent is not easy to handle, this paper aims at providing a big picture of how demographic change might develop and its impact on the future.

2. DEMOGRAPHIC CHALLENGE

The current population dynamics of the African continent are a major demographic challenge in the 21st century. According to the *UN World Population Prospect 2015,* Africa will double its population size by the end of 2050 and nearly quadruplicate by 2100.[1]

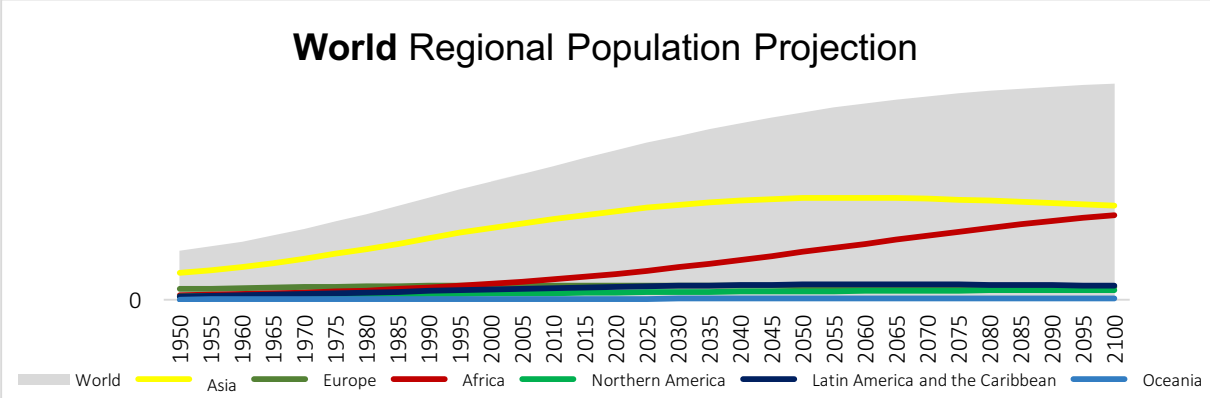

Figure 1: World: Regional Population Projection (Source: UN World Population Prospect 2015)

While population growth rates in Asia are languishing slowly, Africa is growing at a faster pace. By 2050 a quarter of the world's population will be African. There are mainly three reasons why Africa's Population is growing on such a vast scale: Fertility, Longevity and Mortality.

Africa has the highest fertility rate on the planet. In 2014 on average, an African woman gave birth to 5.0 children during her life (World Bank, 2016). This is almost double the global average of 2.5 births per woman. Only nine out of all African countries are below the global average. All of them are located in Northern Africa or on insular states. The fertility rates in Sub-Saharan countries are towering. Top of the list is Niger with an alarming 7.6 births per woman.[2] The total fertility rate (TFR) correlates highly with the infant mortality ($R_{avg.}$=0.67), if we look at the data from 1950-2015. The connection between the decrease in mortality and fertility rates seems to be delayed as the correlation increases further, if we look at a more advanced period ($R_{avg.}$=0.89, 1975-2015).[3] This effect is described as the *bidirectionality of relationships* between low mortality rates and reduced fertility rates. (Kreager, Winney, Ulijaszek, & Capelli, 2015, 361-376). Rwanda for instance was able to decrease its TFR from 8.0 to 3.6. Rwanda had the highest TFR in 1950 and is now in the bottom 30% of all African countries. Still there is no proof for causation, as for example the increase in infant mortality during the genocid did not seem to affect the TFR. There is another exception to the rule – Niger. While infant mortality rates (IMR) decreased by 73% in 65 years, fertility rates stayed almost the same as in 1950. Reason for this could be the mentioned lag, as IMR just started to decrease steadily after 1995. A drop in child mortality seems to have a downward effect on

[1] *See Appendix: Table 1 – Total Population*
[2] *See Appendix: Table 3 - Total Fertility Rate (Country View)*
[3] *See Apendix: Table 4: Correlation between Infant Mortality (Under-five mortality, 5q0 (deaths under age five per 1,000 live births) and Total Fertility (children per woman)*

fertility as couples gain more confidence about the survival of their offspring (Rutayisire, Hooimeijer & Broekhuis, 2014). Still there could be more underlying factors which are driving demographic change in Africa, e.g. health related, economical, educational reasons. These other factors will be further examined in the following Pestel-Analysis.

Another key factor in the demographic transformation of Africa is longevity. The average life expectancy of a newborn in 1950 was 37 years. Withing 65 years this number increased by 22 years and the average newborn in 2050 will live till the age of 70.[4] Decreasing fertilty and mortality rates combined with longer life expectancy are shaping the population pyramid and demographic change within Africa, as it can be seen in figures two and three.

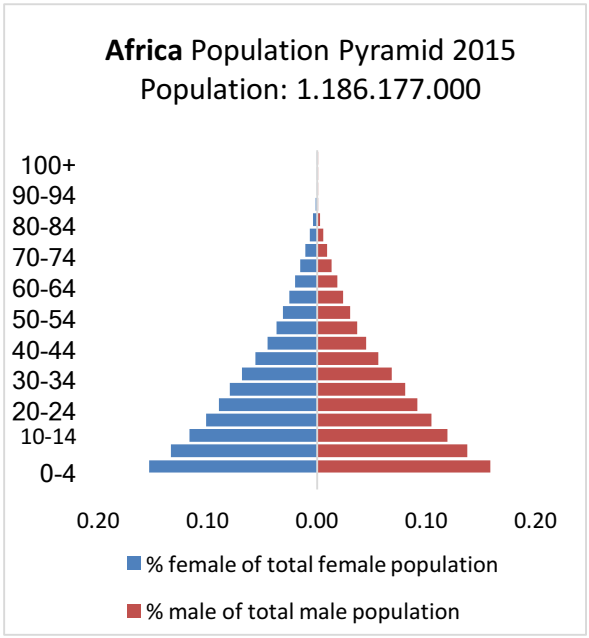

Figure 2: Population Pyramid 2015 (Source: UN World Population Prospect 2015)

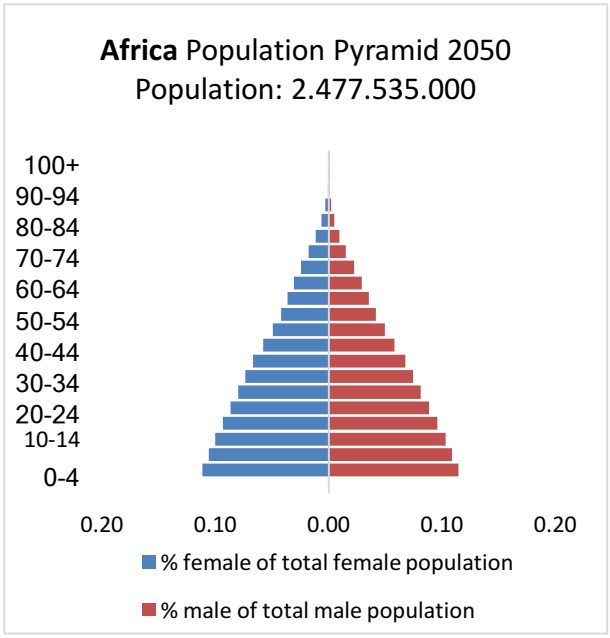

Figure 3: Population Pyramid 2050 (Source: UN World Population Prospect 2015)

Due to these changes, the ratio between working-age (15-65) and dependant population (0-14, 65+) is increasing. This shift in the population structure enables Africa to potentially unlock a demographic dividend.[5] According to the *United Nations Population Fund,* this period of potential economic growth has to be accompanied by *decent job creation, good governance, infrastructure, a functioning business climate and equality* to reach the full potential. If Africa is not able to provide opportunities to the young population, the demographic transformation could cause severe problems and instability. Hence it is crucial to build the right foundation to be able to harvest fruits of the demographic dividend. Africa is

[4] *See Appendix: Table 5: Longevity*

5 *UNFPA:"The demographic dividend is the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population (14 and younger, and 65 and older)." (http://www.unfpa.org/demographic-dividend)*

currently in the early expanding phase of the *Demographic Transition Model* where death rates are declining faster than birth rates and therefore the overall population is growing.[6]

3. PESTEL Analysis

To assess the African continent in a holistic way, this paper uses the PESTEL framework. It is commonly used to measure, analyse and compare countries on several factors. PESTEL is an abbreviation of those factors which combine a view on the political, economic, societal, technological, legal and environmental situation. It is helpful to deeply understand a country or continent from different perspectives either to evaluate it from a business perspective when entering a new market or from a scientific perspective to analyse the ongoing development.

In the following chapter Africa is being analysed along the prior mentioned factors by first giving a quick overview on the respective letter with an explanation on the current status in Africa. Additionally, the trends affecting this perspective are evaluated and they show how demographic change will shape the respective parts until 2050.

Aim of this approach is to give an overall view on Africa and its demographic change, explaining the current status as well as trends and future developments up until 2050.

3.1 Politics

The political situation is crucial for the growth and development of Africa. Poverty could be overcome through sustained growth, given that there are good governmental institutions and a stable and functional investment government. (Groth & May, 2016)

A fragile political situation is one of the main concerns in Africa, as the continent faces different kinds and levels of conflicts, including civil wars, inter-state tensions, domestic or international terrorism and political violence. According to the Fragile States Index 2016, six out of eight countries that belong to the category “Very High Alert” are African countries. They are Somalia, South Sudan, Central African Republic, Sudan, Chad and Congo (D.R.). Civil wars still rumble on in these African countries. The second Libyan Civil War lasts for more than two years and is still ongoing. The Central African Republic conflict causes huge casualty and the flee of thousands of Muslims from the country. Ethnic violence has been seen in South Sudan since its independence in 2011 and later on as a civil war evolved. Terror groups such as Al-Shabaab and Boko Haram (the deadliest terrorist group in the world in 2014)[7] remain very active in the region.

[6] See Appendix: Figure 8: State of Demographic Transition

[7] Nigeria is the home to Boko Haram as well as the largest country in Africa. The massacre carried out by Boko Haram, which led to deaths of approximately 2,000 people in the northeastern village of Doron Baga, shocked the world. At least 7,512 people died in Nigeria due to terrorism in 2014.

However, the general trend is positive. According to Freedom House, the number of democracies in Africa has risen from only three in 1990 to 19 in 2012. In less than 100 years, after most countries achieved independence, the spread of democracy should be largely complete across Africa by 2050. Democracies (labelled by Polity IV database or Freedom House) in Africa should be roughly 50 by 2050 (Robertson, 2012). The share of number of people killed in violent conflicts in Africa has also been decreasing continuously (African Business Magazine, 2013). There has been a slight improvement in the governance of African countries over the last decade. The demographic dividend highlights the role of Africa's middle class. The middle class can be found strongest in African countries that have robust and growing private sectors. The emerging and growing middle class is an essential and crucial element for the growth of democracy (African Development Bank, 2011).

The future depends much on whether political leadership and the necessary human capital will be available to manage the challenge of demographic change, since the economies and infrastructure are still largely underdeveloped in Africa. If the large bulge population are not able to land jobs, the high unemployment rate is associated with the higher risk of political instability, violence and revolution. (Huntington, 1996; Urdal, 2011)

On the other hand, a new form of democracy might thrive because of a higher median age in the population of Northern African countries. Research indicates that a high median age in the population might accelerate democratization and democracy reform (Cincotta, 2011). However, median age in most African countries is still quite low by 2050, due to the high fertility. The impact of the fourth wave of democracy will be a concern in Africa (Abushouk, 2016).

Due to higher internet penetration rates in Africa, social media could raise the awareness of economic, social and political deprivation among African people. North Africa would be the pioneer region for democratization, due to the high human development rate in the region. Substantial progress in human development does not merely improve people's health and education, but also allows them to select leaders, influence public decisions and share knowledge (UNDP, 2010).

The major challenge of the governments in Africa is to implement policies and improve the economies in order to make sure that the young population has guaranteed job opportunities.

Leaders in Africa face the problems of poor resource base, weak state and lack of legitimacy to cope with the demand for democracy.

3.2 Economy

Africa's economy grew by a GDP-CAGR of 8.4% in the last 15 years. Its three largest economies Nigeria, South Africa and Egypt represent more than 50% of the continents total GDP (Figure 4).[8] All of the mentioned countries are also in the top five in terms of absolute

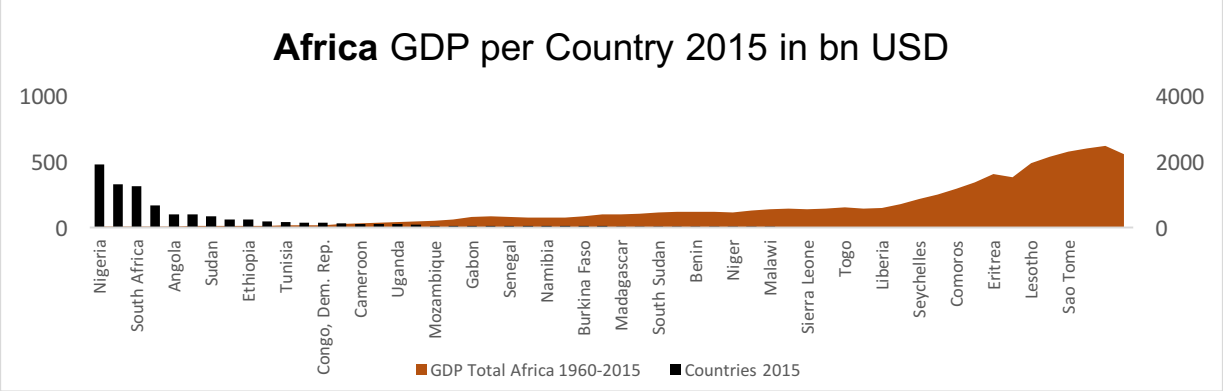

Figure 4: Status Quo: GDP in Africa (Source: The World Bank)

population. Sub-Saharan Africa (SSA) went through a period of tragedy with low growth and high poverty levels between 1960-2000. After the turn of the century, a period of hope began with higher growth rates and improved macroeconomic structures. This hope period is very fragile and seems to be endangered if Africa fails to absorb the transition in working-age population, as they themselves become dependent, if they are not able to find a workplace. Growth in SSA is not sustainable yet. It has been driven by international aid, debt relief and windfall gains in the commodity market as well as the removal of bad policy distortions. Hence, its economy is very vulnerable to external shocks. Their exports comprise mostly natural resources and are not enough diversified with skilled labour or technological goods. (Turbat, 2016, pp. 373-386). GDP growth does not necessarily contribute to employment growth. To ensure stable employment for a growing workforce, policy makers and business leaders need strategies to accelerate job creation in the private-sector and build the macroeconomic conditions for companies to flourish. Eliminate critical obstacles to growth like political instability, insufficient access to financial capital, lack of infrastructure or deficiencies in skilled labour-force. The first step is to understand the job opportunities in each country and then focus on comparative advantages to compete on a global scale. Other emerging markets successfully faced similar challenges during their demographic transition. With 37 million stable jobs created in the past decade, Africa is on the right path but compared with other countries, there is still room for improvement (Cabral et al., 2012, pp. 61-63). If labour demand is not increasing further, there could be an increasing risk of conflict because *youth bulges* will be more likely to join *rebel labour,* due to a lack of worthwhile opportunities (Østby, Rustad & Urdal, 2016, pp. 505-519).

[8] See Appendix: Table 6: GDP

3.3 Society

Africa is a very diverse continent with over 2000 languages, different cultures and religions. The majority of the population are adherents of Islam, mostly located in the northern subcontinent, and Christianity in the southern parts as well as traditional African religions. Nuptiality rate is higher among Muslims in SSA-countries than Non-Muslims, as well as polygyny and fertility rates (Bietsch & Westoff, 2015). The use of contraception is very scarce in Africa with only 33% of married or in-union women.[9] At the same time there is an unmet need for family planning, showing that women want to delay or stop childbirth but were not using any contraceptive methods (UN Department of Economic and Social Affairs, 2015).[10] Geert Hofstede (1980) introduced *cultural dimensions* which will be used to analyse Africa's society. In Africa individuals are affiliated to a family, clan or tribe. This *group identity* actively discourages individual performance. Africans are co-operative, not individualistic. Respect for authority, especially for the elderly, is a key pillar within the society. Autocratic governments made people cautious about disobedience. There is a commitment to the land of their ancestors and the tradition where they came from, but not necessarily to the nation. Females are considered inferior to men and are not involved in decision-making in the male-dominated society (Oppong, 2013, pp. 203-210).[11] Marriage plays a major role in African societies and also affects the demographic dividend. Age at marriage influences education attainment and therefore fertility rates. Delayed marriage and increasing education would result in more women joining the workforce and therefore has an indirect link to overall productivity. One fifth of all school dropouts among African girls is caused by early marriage or pregnancy. However, most premature dropouts result from undervaluation of female education as there are only few employment opportunities for well-educated women (Gage & meekers, 2016, pp. 266-283). The mean years of schooling (MYS) in SSA was 5.6 years in 2015, whereas 31.8% of the working population still had no education and only 4% had tertiary education.[12] The Wittgenstein Centre projects that SSA still will be the least schooled region in 2035 but the educational attainment will rise[13] steadily and also the gender gap will narrow (Eberstadt, 2016). Africa's society faces a lot of challenges and might not be the fertile soil to harness the demographic dividend yet. It needs to enforce laws to prevent early marriage, pursue gender equality and develop educational levels further to generate a skilled labour force with high productivity.

[9] See Appendix: Figure 9: Percentage of women using any method of contraception among those aged 15 to 49 who are married or in a union, 2015

[10] See Appendix: Figure 10 : Percentage of women with an unmet need for family planning among those aged 15 to 49 who are married or in a union, 2015

[11] "My Wife belongs in the kitchen" quote of Nigerian President Buhari 17.10.2016, source: https://www.theguardian.com/commentisfree/2016/oct/17/wife-job-look-after-me-buhari-nigerian-girls

[12] See Appendix: Figure 11: Education Profile in 2010

[13] See Appendix Figure 12: Educational Profile of Working Age (15-64) in Sub-Saharan Africa 1970-2040 (wittgenstein Centre estimates and projections)

3.4 Technology

The technology used in Africa is very diverse, ranging from infrastructure of energy production and supply up to telecommunication and drone projects for logistics as well as health topics. Despite those different areas of application, technology in general is seen as one of the major opportunities Africa can use to evolve into a developed country within the next decades and thereby make use of the demographic dividend. (WEF, 2015)

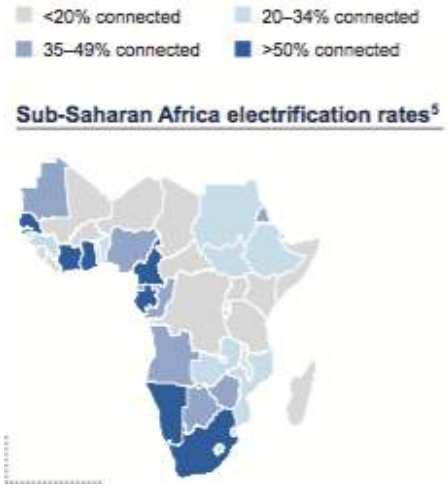

Figure 5: Sub-Saharan Africa electrification rates (Source: McKinsey, 2015b,p.7)

Following a McKinsey report (2015a), there is a close link between the access to electricity and economic development. SSA for example has 13 percent of the world's population, but 48 percent of the share of the global population without access to electricity. This means that almost 600 million people in SSA have no access to electricity. To achieve prosperity in the future, it is expected that Sub-Saharan Africa will consume four times the energy in 2040 than it used in 2010. Since this is affecting peoples' health as well as the environment, a lot is done in funding and financing this expansion which is expected to cost more than US$ 800 billion (McKinsey, 2015b, p.4). A report by the African Development Bank (2011) states that, while climate change is affecting the agricultural sector negatively, energy production will become the major provider of labour by 2060. To comply with this increasing demand, the supply side will have to create up to 2.5 million new jobs until 2040.

While Africa has always been a continent rich in fossil fuels and minerals, new technologies enable a shift towards renewable energies. Especially the potential in solar, geothermal and hydro energy are seen as major energy sources for the future. This could not only solve drastic energy shortage up to 2050, but also be a source of income for countries and labour supply for the population.

Development in the telecommunication sector, mainly driven by increased usage of smartphones, is accelerating so fast that by 2019 there will be 930 million mobile phones in Africa, a penetration of approx. 75% (The Economist, 2015). Smartphones could enable an internet penetration of the continent by 50% within a decade. What can be seen already, but is expected to become more relevant, is the different use-cases of smartphones as they are used to buy insurances, groceries or medicine already. While farmers get informed about weather conditions, children receive education material and hospitals and patients' information and reminder about their medicine.

3.5 Environment

Africa's environment is particularly affected by the global climate change. A report by the IPPC (Intergovernmental panel for climate change) and AMCEN (African Ministerial Conference on the Environment) stresses out that by 2020, between 75 and 250 million people in Africa will be exposed to increased water stress due to climate change. Additionally, some countries' agricultural activities will decline by up to 50% due to a faster change in weather. This will adversely affect food security and also have an impact on jobs and generation of income for the rural population. Besides stronger rainfall and floods, fast weather changes will also generate up to 8% more droughts until 2080, which will affect the African ecosystem and endanger between 25% and 40% of mammal species. To mitigate those effects, Africa has to invest up to 5% of their GDP yearly up to 2050 only to maintain the status quo (Amcen, n.d.). This so called "adaption gap" is seen as the major challenge Africa is facing on an environmentally perspective within the next years. It includes adaptation to extreme weather events, human health issues, agriculture, water supply, riverine flood protection, coastal zone protection and infrastructure (Amcen, n.d.).

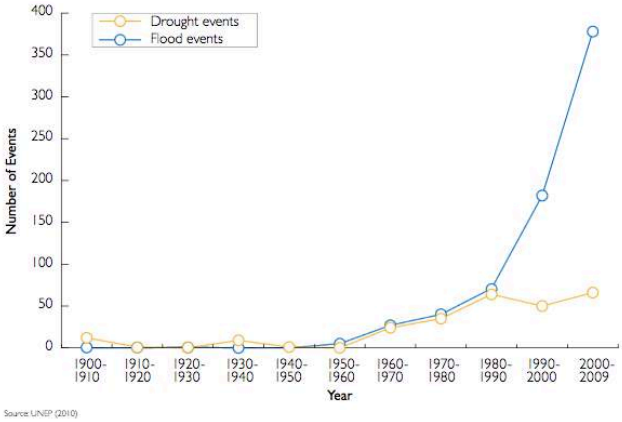

Figure 6: Trends of some Extreme Weather Events associated with climate change (Source: UNEP, 2010, p.166)

Several initiatives address the topic that Africa with its large area and especially large population needs to raise awareness in lowering CO2 emission and setting goals for companies and private households. This is particularly important for the strong growth in the energy sector and its shift towards green energy.

Along with the effects on nature, the changing environment also affects areas of deployment for people, security of families due to fleeing of floods and health issues. Therefore, steps are taken to target issues such as air quality, chemicals and waste, and freshwater and sanitation topics, all consequences of a growing population and development of the country. (UNEP, 2013)

Main steps to tackle those challenges is to enforce regulations on global, continent and country level, which ensures binding rules to lower CO2 emission, sustain resilience and enable development into the right direction. Institutions such as the World Bank show first pilot projects such as the "Africa Climate Business Plan". (World Bank, 2015)

3.6 Legal and Regulatory

Legal development and demographic change are interrelated in Africa. A legal system permitting girls to get married at a relative young age contributes to the high fertility rate in Africa. Legislation on age at marriage should be adjusted corresponding to fertility control programs initiated by African governments. By delaying the legal age for marriage, fertility rate can be lowered. Given that most African countries are Muslim countries that oppose to births out of wedlock, it decreases births among young mothers. Morocco and Tunisia are two examples which increased the legal marrying age. (Locoh, 2006)

Rule of law is fundamental for democracy as well as facilitating socioeconomic development, which is very important during African demographic change. Growth could be driven up through the strengthening of the rule of law, which reflects the security of property rights and the extent of contract enforcement. Corruption nature and deterioration in rule of law remains the cause of concern. Despite some modest improvements, high corruption is still expected to be prevalent. According to Transparency International's Corruption Perceptions Index, 90 percent of African states still rank below 50. (African Development Bank, 2014) There is a lack of civil and political rights of women in Africa at the moment. Discrimination against women regarding property right persists because of the gender bias in customary law as well as discriminatory legislation in many African states. (Vimard & Fassassi, 2012)

The regulatory environment is usually more conductive to starting and operating businesses when adherence to the rule of law is strong (Calingaert, 2016). According to the data from the World Bank and *Freedom in the World*, the ease of doing business is positively correlated to the level of rule of law in the region (see Figure 7).

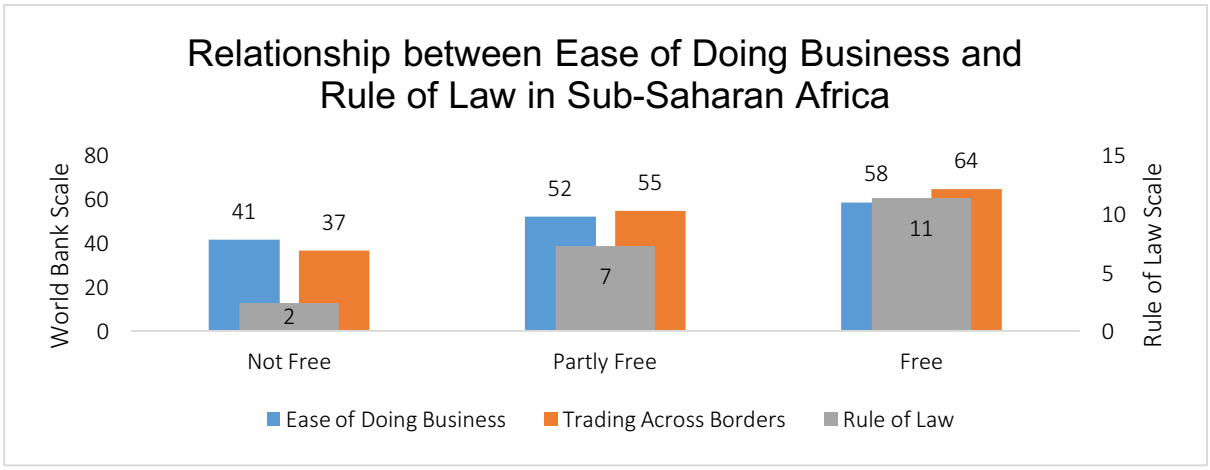

Figure 7: Relationship between Ease of Doing Business and Rule of Law in Sub-Saharan Africa (Source: World Bank and Freedom in the World data, 2016)

There is a trend of business regulatory environment improvement for small and medium sized companies in some African regions. Sub-Saharan Africa had the highest number of business regulatory reforms globally in the year 2013-2014, with 75 of the 230 documented worldwide (The World Bank, 2014). However, the increasing costs and complexity of business incorporation in this region still posts challenges. More transparent policies are needed for poorly developed financial systems in Africa.

Since the size of the working age population remains large relative to the dependent population, it creates a gap for African governments to structure regulatory mechanisms for public and private health insurance in order to accommodate the financing of the health care needed by the ageing population in the future (Nugent & Seligman, 2008).

Regulations in markets such as land markets are needed. Land ownership has been a volatile issue and the cause of many clan, inter-ethnic and inter-communal conflicts since decades. Although urbanization occurs gradually, access to land will still be important for the rural population from now until 2050. Countries like Zimbabwe, South Africa and Kenya have tried to reform their land policies, however, they often end up in disasters. Rule of law must therefore also address land problems in the future (Mutua, 2016).

4. Conclusion

Africa's population dynamics will have a huge impact on the world's demography. Grasping the scale of this challenge and finding convictive solutions will determine, if Africa will grow beyond its potential or precipitate into ruin.

Africa is growing in terms of GDP but the rising workforce is in need of immense job creation to meet the new labour supply. This will be one of the major challenges to sustain stability and prevent conflicts due to labour shortage. To harvest the potential of a growing labour force, a job-creation programme is needed and the macroeconomic conditions have to be established to encourage entrepreneurship and attract foreign investments.

This is where Technology can play a major role. Due to new technologies in the energy market, renewable energy sources can be harvested more efficient and create new jobs and areas for investment. The increasing demand for electricity in rural areas and the trend of urbanisation increase demand for energy all over Africa. Energy in the long run is only sustainable for Africa, if generated with renewable resources, because climate change is affecting Africa's population especially in the agricultural industry. Floods and droughts bring food scarcity, make people flee from their homes and destroy job opportunities. Since the major source of income, which is agriculture, is declining, people on the one hand have to realise the importance of the reduction of CO2 emissions and, on the other hand, have to

slowly shift their knowledge into new areas such as energy or telecommunication, two growing sectors on the continent.

Political and legal development can be seen as going hand-in-hand. Political stability is essential for legal reforms. On the other hand, rule of law is the foundation of democratization. These two elements generate huge impacts on economic development and thus human development in the continent. Political and legal development is walking on an uncertain path from now until 2050. Slight improvements have been seen, but they are not continuous. Whether progress in improvement on governance as well as legal and regulatory structures will go smoothly depends on whether political leadership and appropriate human capital are available. In an increasing globalized world, demographic change in Africa also affects the other areas of the planet. Developed countries all over the world should hence assist Africa in improving its governmental institutions and legal reforms, therefore trade with Africa can be facilitated to achieve a win-win situation.

Finally, Africa has to enforce laws to prevent early marriage, pursue gender equality and develop educational levels further to generate a skilled labour force with high productivity. A shift in society towards individualism and entrepreneurial encouragement could drive domestic enterprises and ensure sustainable economic growth as well as stability within the labour market. If Africa is able to manage these formidable challenges properly, it could result in long term prosperity and positively mould the continents future.

5. RECOMMENDATIONS

A better institutional environment is fundamental for capital formation, employment creation and entrepreneurial activities by the private sector, which help reap the productivity and growth effects of an increasing work force. Right policy decisions such as restructuring in manufacturing and agriculture should be made in order to accelerate the transition in Africa to smaller families, healthier and better-educated youth and an expanded job market (The Heritage Foundation, 2015). It is crucial to turn this seemingly threatening demographic change into an opportunity that is one of its kind.

Africa is very likely to accommodate 40% of the world's population by 2100, therefore an infrastructure must be created to improve people's livelihood in the continent. Economies of African countries should be improved and diversified in order to lift the population out of poverty. Education, safety and healthcare systems should be part of the improvement. With this foreseeable large urban population, problems like environmental damage, insufficient access to transport and energy supply might be triggered (Kirk, 2016). The Department for International Development of the United Kingdom has suggested measures such as

modernizing Kenyan ports, upgrading roads from Uganda to Rwanda and increasing power supply to Nigeria's huge population.

Improving the living conditions for the population, especially for the female population, is essential for the decrease of the number of children. Since women enjoy more opportunities to participate in working life if they have higher education, women would be empowered to enjoy greater decision-making power. Women would be thus free to conduct family planning and control the number of children they would like to have. Total fertility rate would also be lower when medical care service to decrease infant mortality rates would be improved, because couples are only willing to give birth to fewer babies when the survival rate of their children is high (Sippel, Kiziak, Woellert, & Klingholz, 2011). Women are also the primary pillars of land and should not be excluded from land ownership reform process.

Urbanization of Africa will be one of the largest shifts of this century, thus imposing challenges to local governments as well as the world. Investment in cities such as assisting them to deliver agglomeration economies should be facilitated in order to reduce the costs caused by increasing congestion. Reform in property rights and land regulation should be accelerated so different use cases of land in urban planning purpose can be carried out. (African Development Bank, 2011)

Food and water demand keeps increasing due to the rising population. Agriculture revolution and modernization is therefore necessary to cope with demographic change (Cohen, 2014). Use of nutritional supplements such as fertilizers should be promoted in order to increase long-term fertility of the soil. New technologies such as genetic engineering might be introduced to get access to new varieties of crops under climate change. (Bremner, 2012) Water and sanitation infrastructure shall be improved.

The support of deepening regional integration is significant for Africa. Africa is a continent of many countries. Domestic market is small and the focus is often shifted to external market for higher trade gains. Many landlocked African countries rely on their neighbouring countries to build up common infrastructure for global market access. They can also benefit from economies of scale to achieve efficiency in industrial production if they cooperate. (African Development Bank, 2011)

Looking on Africa from a technological perspective it is clear that this is an area of tremendous development and a unique opportunity until 2050. With ongoing trends such as urbanization and digitalization, combined with better access to the electrical grid, it is expected that Africa will consume four times the electricity in 2040 than it used to in 2010. To correspond this demand, a major challenge is to develop the generation of energy and the infrastructure for deployment. Both are constrained by financial means which need to come from globally located investors. To ensure these investments, it is crucial to have low risks

associated with the investments which are enabled through high transparency, regulations, integration of all stakeholders and constant flow of information. Therefore, governments have a high responsibility and need to act upon those recommendations. Additionally, the investments need to be interesting for financial institutions, which implies a certain return on investment. Currently, the limited financial means by the African population are restricting high energy prices. Therefore, a two-step approach is necessary to enable further expansion of energy supply and meanwhile lower prices of electricity.

First, the shift towards renewable energies is necessary since those energy sources can be used efficiently with recent technology developments. By now especially geothermal, hydropower and solar power should be the main focus for future energy production. Besides the fact that before now renewable energy production was not efficient enough, the initial investments where too high. As second step in the approach, Africa should be able now to gather international investors since the infrastructure, data generation and governmental institutions are at a level where international firms are able to assess the risks associated with their investments. Following these steps that are discussed by many institutions, Africa could not only overcome its current energy deficit but could become one of the leading renewable energy providers by 2050.

While other aspects can be influenced strongly and used as opportunity, the environmental changes, mainly caused by climate change, leave Africa as victim now and in the future. Catastrophes such as floods, droughts or cyclopes, will increase rapidly within the next years and endanger the agricultural sector as food supply as well as security of families and areas of employment. Africa will need to invest billions just to close the “adaption gap” (see chapter 3.5 – Environment), while it is not able to take advantage from it. The only actions that can be taken are to actively reduce CO2 emission and slow down climate change, so that the countries have the possibilities to react and shift from an agriculture driven environment to other areas of deployment.

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7. APPENDIX

Total Population (thousands)						
Location	**1950**	**2000**	**2015**	**2025**	**2050**	**2100**
World	2'525'149	6'126'622	7'349'472	8'141'661	9'725'148	11'213'317
Asia	1'394'018	3'714'470	4'393'296	4'774'708	5'266'848	4'888'653
Europe	549'089	726'407	738'442	738'090	706'793	645'577
Africa	228'902	814'063	1'186'178	1'504'213	2'477'536	4'386'591
Northern America	171'615	313'724	357'838	384'274	433'114	500'143
Latin America and the Caribbean	168'844	526'890	634'387	695'584	784'247	721'224
Oceania	12'682	31'068	39'331	44'791	56'609	71'129

Table 1: Total Population (Source: World Population Prospect 2015, Available: https://esa.un.org/unpd/wpp/)

	Total Africa		
	Fertility rate, total (births per woman)	Life expectancy at birth, total (years)	Mortality rate, under-5 (per 1,000)
1960	6.7	42	N/A
1961	6.7	42	266
1962	6.7	43	261
1963	6.7	43	258
1964	6.7	43	251
1965	6.7	44	245
1966	6.7	44	242
1967	6.7	45	239
1968	6.7	45	236
1969	6.7	45	232
1970	6.7	46	229
1971	6.7	46	221
1972	6.7	47	218
1973	6.6	47	214
1974	6.6	48	210
1975	6.6	48	207
1976	6.6	48	203
1977	6.6	49	198
1978	6.6	49	194
1979	6.5	50	191
1980	6.5	50	187
1981	6.5	50	183
1982	6.4	51	179
1983	6.4	51	176
1984	6.3	51	173
1985	6.3	52	170
1986	6.2	52	169
1987	6.1	52	167
1988	6.0	52	166
1989	6.0	52	164
1990	5.9	52	164
1991	5.8	52	163
1992	5.7	52	162
1993	5.6	52	161
1994	5.5	53	160
1995	5.4	53	157
1996	5.4	53	155
1997	5.3	53	152
1998	5.2	53	149
1999	5.1	53	146
2000	5.1	53	142
2001	5.0	54	138
2002	5.0	54	134
2003	4.9	54	130
2004	4.8	55	127
2005	4.8	55	123
2006	4.7	55	119
2007	4.7	56	115
2008	4.6	56	111
2009	4.5	57	107
2010	4.5	57	104

Table 2: Growth Drivers Total Africa (Source: The World Bank, Available: http://databank.worldbank.org/data/reports.aspx?source=africa-development-indicators)

Total fertility (children per woman)				
	1950 - 1955	2010 - 2015	2050 - 2055	2095 - 2100
Niger	7.3	7.6	4.5	2.5
Somalia	7.3	6.6	3.5	2.3
Mali	7.0	6.4	3.3	2.1
Angola	7.3	6.2	3.4	2.2
Chad	6.1	6.3	3.2	2.1
Democratic Republic of the Congo	6.0	6.2	3.2	2.1
Gambia	5.3	5.8	3.2	2.0
Uganda	6.9	5.9	3.2	2.1
Nigeria	6.4	5.7	3.4	2.3
Burkina Faso	6.1	5.7	3.1	2.2
Zambia	6.8	5.5	3.6	2.6
Mozambique	6.6	5.5	3.2	2.2
United Republic of Tanzania	6.7	5.2	3.3	2.3
Malawi	6.9	5.3	3.2	2.2
Senegal	6.6	5.2	3.2	2.3
Côte d'Ivoire	6.8	5.1	3.2	2.3
South Sudan	6.7	5.2	2.9	2.0
Guinea	6.0	5.1	2.9	2.1
Congo	5.7	5.0	3.1	2.3
Guinea-Bissau	5.9	5.0	2.9	2.1
Equatorial Guinea	5.5	5.0	2.6	1.9
Benin	5.9	4.9	2.8	2.0
Liberia	6.3	4.8	2.9	2.1
Cameroon	5.5	4.8	2.9	2.1
Africa Avg.	6.6	4.7	3.0	2.2
Mauritania	6.3	4.7	3.0	2.2
Sao Tome and Principe	6.2	4.7	2.9	2.1
Togo	6.3	4.7	2.9	2.1
Sierra Leone	6.0	4.8	2.4	1.9
Comoros	6.0	4.6	2.7	2.0
Madagascar	7.3	4.5	2.9	2.1
Sudan	6.7	4.5	2.7	2.0
Kenya	7.5	4.4	2.7	2.0
Eritrea	7.0	4.4	2.6	1.9
Central African Republic	5.5	4.4	2.4	1.9
Ethiopia	7.2	4.6	2.2	1.8
Ghana	6.4	4.3	2.7	2.0
Mayotte	7.9	4.1	2.4	1.8
Gabon	4.0	4.0	2.4	1.9
Zimbabwe	6.8	4.0	2.3	1.9
Rwanda	8.0	4.1	2.1	1.7
Namibia	6.0	3.6	2.2	1.9
Egypt	6.6	3.4	2.3	1.9
Swaziland	6.7	3.4	2.1	1.8
Lesotho	5.8	3.3	2.1	1.9
Djibouti	6.3	3.3	2.0	1.8
Botswana	6.5	2.9	1.9	1.8
Algeria	7.3	2.9	1.9	1.9
World Avg.	5.0	2.5	2.2	2.0
Morocco	6.6	2.6	1.9	1.8
Libya	7.1	2.5	1.8	1.8
South Africa	6.3	2.4	1.8	1.8
Seychelles	5.0	2.3	1.9	1.9
Cabo Verde	6.6	2.4	1.7	1.8
Réunion	6.9	2.2	1.8	1.8
Tunisia	6.7	2.2	1.8	1.8
Western Sahara	6.3	2.2	1.7	1.8
Mauritius	5.9	1.5	1.6	1.8

Table 3: Total Fertility Rate (Source: The World Bank, http://databank.worldbank.org/data/reports.aspx?source=africa-development-indicators)

Correlation between Infant Mortality and Fertility

		1950 - 1955	1955 - 1960	1960 - 1965	1965 - 1970	1970 - 1975	1975 - 1980	1980 - 1985	1985 - 1990	1990 - 1995	1995 - 2000	2000 - 2005	2005 - 2010	2010 - 2015	2015 - 2020	R after 1950	R after 1975
Total Africa	Mortality	310	282	258	238	220	199	183	171	167	152	131	108	90	80	**0.90**	**0.97**
	Fertility	6.60	6.64	6.70	6.67	6.67	6.62	6.48	6.20	5.73	5.35	5.10	4.89	4.71	4.41		
Niger	Mortality	325	325	324	324	325	323	313	319	293	242	191	149	104	88	**-0.32**	**0.41**
	Fertility	7.28	7.35	7.44	7.32	7.52	7.63	7.59	7.69	7.74	7.75	7.72	7.68	7.63	7.46		
Somalia	Mortality	335	312	291	271	253	235	219	211	222	176	161	147	131	116	**0.43**	**0.55**
	Fertility	7.25	7.25	7.25	7.25	7.10	7.00	7.07	7.26	7.53	7.70	7.44	7.10	6.61	6.12		
Mali	Mortality	428	414	408	390	356	326	294	268	246	225	205	153	122	102	**0.70**	**0.91**
	Fertility	6.95	6.95	7.00	7.10	7.15	7.15	7.15	7.15	7.15	6.95	6.85	6.70	6.35	5.92		
Angola	Mortality	375	352	329	308	291	271	264	258	253	232	193	171	156	140	**0.86**	**0.96**
	Fertility	7.30	7.35	7.40	7.40	7.35	7.35	7.30	7.25	7.15	7.00	6.80	6.60	6.20	5.79		
Chad	Mortality	312	298	284	269	247	233	220	207	199	189	182	173	155	141	**-0.29**	**0.67**
	Fertility	6.10	6.20	6.30	6.40	6.67	6.87	7.04	7.21	7.39	7.41	7.24	6.85	6.31	5.79		
Democratic Republic of the Congo	Mortality	281	266	255	243	226	218	205	194	182	188	163	134	115	103	**-0.17**	**0.68**
	Fertility	5.98	5.98	6.04	6.15	6.29	6.46	6.72	6.98	7.10	7.10	6.95	6.60	6.15	5.66		
Gambia	Mortality	383	367	351	307	268	232	200	175	156	138	108	90	83	75	**-0.25**	**0.97**
	Fertility	5.29	5.46	5.70	5.96	6.20	6.34	6.29	6.14	6.08	5.99	5.85	5.79	5.78	5.53		
Uganda	Mortality	271	246	220	195	187	185	185	187	175	156	126	106	93	84	**0.75**	**0.93**
	Fertility	6.90	6.95	7.05	7.12	7.10	7.10	7.10	7.10	7.06	6.95	6.74	6.38	5.91	5.46		
Nigeria	Mortality	336	313	288	269	249	228	212	213	213	200	172	142	122	109	**0.64**	**0.95**
	Fertility	6.35	6.35	6.35	6.35	6.61	6.76	6.76	6.60	6.37	6.17	6.05	5.91	5.74	5.41		
Burkina Faso	Mortality	376	351	327	301	283	258	229	212	204	190	173	127	108	96	**0.33**	**0.95**
	Fertility	6.10	6.24	6.35	6.56	6.70	7.02	7.17	7.07	6.93	6.73	6.43	6.08	5.65	5.23		
Zambia	Mortality	251	231	214	198	177	165	167	178	182	166	132	106	83	68	**0.77**	**0.83**
	Fertility	6.75	6.90	7.15	7.40	7.42	7.38	7.00	6.68	6.35	6.15	6.05	5.90	5.45	5.14		
Mozambique	Mortality	366	337	310	290	267	250	256	247	229	185	144	116	99	86	**0.94**	**0.97**
	Fertility	6.60	6.60	6.60	6.60	6.58	6.52	6.44	6.33	6.12	5.85	5.80	5.65	5.45	5.12		
United Republic of Tanzania	Mortality	259	242	230	216	199	180	172	166	165	145	106	77	51	43	**0.95**	**0.94**
	Fertility	6.74	6.80	6.80	6.79	6.75	6.73	6.55	6.36	6.05	5.75	5.66	5.58	5.24	4.92		
Malawi	Mortality	348	337	325	313	290	270	253	242	215	177	146	106	77	64	**0.84**	**0.99**
	Fertility	6.85	6.90	7.00	7.20	7.40	7.60	7.60	7.30	6.70	6.40	6.10	5.80	5.25	4.88		
Senegal	Mortality	320	302	293	299	276	226	186	150	138	140	114	82	54	41	**0.82**	**0.94**
	Fertility	6.57	6.83	7.06	7.24	7.41	7.45	7.25	6.88	6.35	5.78	5.38	5.15	5.18	4.83		
Côte d'Ivoire	Mortality	394	351	299	254	216	184	164	154	149	143	131	120	105	91	**0.60**	**0.98**
	Fertility	6.77	7.15	7.53	7.83	7.93	7.81	7.31	6.85	6.41	6.05	5.68	5.36	5.10	4.77		
South Sudan	Mortality	408	375	349	325	305	284	276	253	220	190	165	142	122	107	**0.80**	**0.95**
	Fertility	6.65	6.70	6.75	6.85	6.90	6.92	6.78	6.83	6.65	6.42	6.00	5.60	5.15	4.73		
Guinea	Mortality	346	335	327	322	311	289	265	241	216	187	161	139	101	86	**0.68**	**0.93**
	Fertility	6.00	6.07	6.15	6.18	6.29	6.45	6.59	6.63	6.51	6.24	5.91	5.54	5.13	4.73		
Congo	Mortality	240	207	177	158	145	135	125	122	125	134	129	98	75	63	**0.56**	**0.66**
	Fertility	5.68	5.79	5.99	6.19	6.35	6.35	6.00	5.55	5.21	5.12	5.10	5.05	4.95	4.64		
Guinea-Bissau	Mortality	312	302	290	274	260	244	228	217	204	192	180	168	152	137	**0.52**	**0.91**
	Fertility	5.90	5.90	5.95	6.00	6.10	6.25	6.70	6.68	6.50	6.05	5.60	5.23	4.95	4.56		
Equatorial Guinea	Mortality	329	312	296	281	266	251	219	203	184	163	145	127	109	95	**0.44**	**0.76**
	Fertility	5.50	5.50	5.53	5.66	5.68	5.68	5.79	5.89	5.89	5.87	5.64	5.36	4.97	4.52		
Benin	Mortality	349	322	297	274	249	226	205	188	168	149	131	116	108	100	**0.51**	**0.95**
	Fertility	5.86	6.13	6.42	6.65	6.83	7.00	7.01	6.88	6.56	6.16	5.78	5.31	4.89	4.50		
Liberia	Mortality	333	325	316	292	267	246	231	237	234	192	140	100	85	73	**0.82**	**0.97**
	Fertility	6.27	6.35	6.47	6.59	6.80	6.93	6.96	6.72	6.27	6.05	5.68	5.23	4.83	4.47		
Cameroon	Mortality	286	266	245	225	202	178	160	151	144	140	138	131	115	101	**0.24**	**0.92**
	Fertility	5.49	5.53	5.80	6.08	6.31	6.47	6.70	6.60	6.22	5.77	5.49	5.21	4.81	4.46		
Mauritania	Mortality	285	257	228	206	188	170	147	130	123	113	112	104	90	84	**0.80**	**0.96**
	Fertility	6.34	6.71	6.79	6.79	6.75	6.57	6.28	6.09	5.85	5.55	5.26	4.97	4.69	4.39		
Sao Tome and Principe	Mortality	210	187	162	142	120	101	98	93	87	82	77	67	63	59	**0.69**	**0.99**
	Fertility	6.20	6.20	6.30	6.40	6.52	6.50	6.24	5.96	5.68	5.41	5.15	4.90	4.67	4.36		
Togo	Mortality	321	288	259	233	208	186	167	153	142	132	124	100	86	72	**0.68**	**0.98**
	Fertility	6.33	6.42	6.65	6.94	7.20	7.28	7.06	6.62	6.02	5.54	5.31	5.04	4.69	4.35		
Sierra Leone	Mortality	420	406	392	372	315	276	253	253	273	248	217	180	134	117	**0.52**	**0.97**
	Fertility	5.97	5.97	5.97	5.97	6.06	6.25	6.46	6.66	6.62	6.41	6.05	5.51	4.79	4.28		
Comoros	Mortality	288	270	249	230	208	187	158	133	114	103	101	91	78	69	**0.70**	**0.94**
	Fertility	6.00	6.60	6.91	7.05	7.05	7.05	7.05	6.70	6.10	5.60	5.20	4.90	4.60	4.23		
Madagascar	Mortality	295	271	250	229	210	193	173	170	152	117	87	67	55	44	**0.96**	**0.98**
	Fertility	7.30	7.30	7.30	7.30	7.30	7.00	6.10	6.30	6.14	5.80	5.28	4.83	4.50	4.21		
Sudan	Mortality	228	205	185	168	154	146	143	137	130	119	106	93	82	74	**0.84**	**0.99**
	Fertility	6.65	6.65	6.75	6.86	6.90	6.92	6.63	6.30	6.00	5.63	5.25	4.83	4.46	4.13		
Kenya	Mortality	248	226	196	172	148	128	109	105	109	112	103	89	78	70	**0.77**	**0.81**
	Fertility	7.48	7.78	8.06	8.11	7.99	7.64	7.22	6.54	5.57	5.07	5.00	4.80	4.44	4.10		
Eritrea	Mortality	292	279	264	239	210	189	175	156	130	102	84	72	60	48	**0.91**	**0.97**
	Fertility	6.96	6.96	6.82	6.70	6.62	6.62	6.70	6.51	6.20	5.60	5.10	4.80	4.40	4.02		
Central African Republic	Mortality	341	318	296	269	234	200	183	179	182	185	184	173	151	133	**0.53**	**0.91**
	Fertility	5.52	5.75	5.90	5.95	5.95	5.95	5.95	5.90	5.65	5.54	5.30	4.85	4.41	4.02		
Ethiopia	Mortality	334	305	270	250	237	231	237	212	191	156	123	91	74	61	**0.82**	**0.95**
	Fertility	7.17	6.90	6.90	6.87	7.10	7.18	7.42	7.37	7.09	6.83	6.13	5.26	4.59	3.99		
Ghana	Mortality	249	226	205	189	177	163	151	133	114	104	94	84	78	71	**0.89**	**1.00**
	Fertility	6.44	6.64	6.84	6.95	6.90	6.69	6.35	5.88	5.34	4.81	4.57	4.29	4.25	3.95		
Mayotte	Mortality	222	153	113	82	60	44	32	23	17	12	9	7	5	4	**0.70**	**0.97**
	Fertility	7.91	7.91	7.91	7.91	7.91	7.91	7.35	6.73	5.25	5.08	4.80	4.60	4.10	3.73		
Gabon	Mortality	302	281	266	227	190	155	123	97	91	89	89	77	62	52	**-0.04**	**0.84**
	Fertility	3.99	4.20	4.59	4.98	5.23	5.57	5.72	5.58	5.22	4.77	4.35	4.15	4.00	3.88		
Zimbabwe	Mortality	191	174	158	145	132	117	97	84	81	94	101	91	72	55	**0.76**	**0.64**
	Fertility	6.80	7.00	7.30	7.40	7.40	7.30	6.74	5.66	4.77	4.20	4.02	4.02	4.02	3.85		
Rwanda	Mortality	271	256	242	232	228	217	180	189	466	193	145	90	73	61	**0.56**	**0.49**
	Fertility	8.00	8.15	8.20	8.20	8.28	8.43	8.38	7.99	6.55	5.90	5.40	4.85	4.05	3.62		
Namibia	Mortality	257	223	193	168	145	124	107	92	81	75	75	56	42	36	**0.76**	**0.95**
	Fertility	6.00	6.10	6.20	6.30	6.60	6.60	6.20	5.55	4.91	4.29	3.81	3.60	3.60	3.31		
Egypt	Mortality	387	315	278	251	238	189	149	102	80	49	38	30	24	20	**0.95**	**0.95**
	Fertility	6.62	6.65	6.55	6.20	5.70	5.60	5.49	5.15	4.12	3.40	3.15	2.98	3.38	3.16		
Swaziland	Mortality	260	240	225	210	183	156	128	108	95	114	128	114	92	81	**0.74**	**0.65**
	Fertility	6.70	6.70	6.75	6.85	6.87	6.73	6.54	6.13	5.30	4.49	4.01	3.75	3.36	3.06		
Lesotho	Mortality	253	225	200	193	181	159	134	118	94	106	116	105	82	67	**0.84**	**0.83**
	Fertility	5.84	5.86	5.81	5.80	5.80	5.69	5.46	5.14	4.70	4.37	3.79	3.37	3.26	3.01		
Djibouti	Mortality	261	242	222	202	171	157	141	129	120	112	106	98	83	76	**0.77**	**0.96**
	Fertility	6.31	6.39	6.55	6.71	6.84	6.84	6.26	6.18	5.85	4.81	4.21	3.70	3.30	2.99		
Botswana	Mortality	201	182	165	150	128	104	86	77	73	84	77	48	40	36	**0.85**	**0.83**
	Fertility	6.50	6.58	6.65	6.70	6.55	6.37	5.96	5.11	4.32	3.70	3.18	2.90	2.90	2.67		
Algeria	Mortality	278	255	231	209	188	157	103	71	60	52	46	41	36	30	**0.90**	**0.93**
	Fertility	7.28	7.38	7.65	7.85	7.57	7.18	6.32	5.30	4.12	2.88	2.58	2.72	2.93	2.62		
Morocco	Mortality	252	233	211	190	171	150	118	89	68	55	47	39	32	25	**0.96**	**0.98**
	Fertility	6.61	6.90	7.15	6.90	6.43	5.90	5.40	4.45	3.70	2.97	2.52	2.49	2.56	2.38		
Libya	Mortality	346	317	228	164	119	86	63	50	39	35	32	29	29	25	**0.67**	**0.97**
	Fertility	7.14	7.20	7.30	7.99	8.10	7.67	6.68	5.71	4.22	3.25	2.75	2.66	2.53	2.32		
South Africa	Mortality	166	145	132	119	108	98	82	69	63	69	77	72	51	43	**0.93**	**0.79**
	Fertility	6.30	6.20	6.10	5.70	5.47	5.00	4.56	4.00	3.34	2.95	2.80	2.55	2.40	2.28		
Seychelles	Mortality	111	101	92	80	54	36	24	16	15	14	13	13	13	10	**0.88**	**0.97**
	Fertility	5.00	5.00	5.59	5.92	5.38	4.27	3.51	2.94	2.57	2.18	2.20	2.30	2.33	2.21		
Cabo Verde	Mortality	197	190	184	157	133	106	82	66	54	41	32	25	24	20	**0.87**	**0.97**
	Fertility	6.57	6.76	6.97	6.97	6.86	6.62	6.10	5.63	4.93	4.14	3.22	2.62	2.37	2.19		
Réunion	Mortality	222	153	113	82	60	44	32	23	17	12	9	7	5	4	**0.94**	**0.96**
	Fertility	6.93	6.57	6.56	5.67	3.88	3.12	2.78	2.71	2.40	2.33	2.44	2.40	2.24	2.12		
Tunisia	Mortality	302	286	256	210	164	116	77	57	41	33	26	20	20	18	**0.92**	**0.98**
	Fertility	6.65	6.85	6.99	6.92	6.38	5.65	4.82	4.00	2.98	2.34	2.04	2.02	2.16	2.07		
Western Sahara	Mortality	328	301	280	260	240	199	160	125	106	88	70	56	46	37	**0.95**	**1.00**
	Fertility	6.34	6.42	6.53	6.60	6.57	6.23	5.33	4.54	3.96	3.18	2.81	2.44	2.20	2.06		
Mauritius	Mortality	168	113	86	81	84	47	31	27	21	22	16	15	14	12	**0.91**	**0.96**
	Fertility	5.90	5.90	6.20	4.61	3.47	3.10	2.30	2.31	2.25	2.03	1.93	1.70	1.50	1.44		
Mittelwert																0.67	0.89

Table 4: Correlation between Infant Mortality (Under-five mortality, 5q0 (deaths under age five per 1,000 live births) and Total Fertility (children per woman) (Source: World Population Prospect 2015, Available: https://esa.un.org/unpd/wpp/)

Life expectancy, e(x), at exact age x (years)					
Location	Age	1950 - 1955	2010 - 2015	2045 - 2050	2095 - 2100
Africa	0	37.34	59.55	69.91	78.07
Burundi	0	39.02	56.07	68.15	76.68
Comoros	0	38.71	62.83	70.41	78.85
Djibouti	0	41.03	61.61	68.20	75.94
Eritrea	0	35.82	63.07	72.82	80.37
Ethiopia	0	34.07	63.13	74.52	81.33
Kenya	0	42.29	60.62	71.65	79.50
Madagascar	0	36.31	64.50	74.09	81.99
Malawi	0	36.26	60.97	74.79	80.43
Mauritius	0	50.19	74.15	79.88	86.79
Mayotte	0	47.20	79.34	86.22	92.41
Mozambique	0	31.28	54.63	68.78	76.76
Réunion	0	47.83	79.54	86.23	92.43
Rwanda	0	40.01	63.14	74.59	81.31
Seychelles	0	57.96	72.94	78.71	85.45
Somalia	0	33.98	54.88	65.37	74.06
South Sudan	0	27.86	55.06	66.13	72.97
Uganda	0	39.99	57.25	69.07	77.04
United Republic of Tanzania	0	41.24	64.04	74.21	80.02
Zambia	0	42.06	58.75	71.78	78.50
Zimbabwe	0	48.53	54.78	71.18	78.25
Angola	0	29.99	51.68	64.71	75.44
Cameroon	0	38.54	54.87	68.57	77.25
Central African Republic	0	33.43	49.53	68.26	78.38
Chad	0	36.03	51.13	61.58	75.95
Congo	0	43.16	61.42	72.85	78.99
Democratic Republic of the Congo	0	39.05	58.10	69.15	77.73
Equatorial Guinea	0	34.47	57.13	69.62	80.45
Gabon	0	36.99	63.65	73.75	79.52
Sao Tome and Principe	0	46.40	66.23	70.38	76.01
Algeria	0	42.89	74.42	81.43	87.94
Egypt	0	41.13	70.84	76.75	84.27
Libya	0	36.65	71.47	76.74	84.06
Morocco	0	45.66	73.61	80.54	86.90
Sudan	0	44.53	63.08	69.98	77.15
Tunisia	0	38.81	74.60	79.93	85.95
Western Sahara	0	35.46	67.61	76.40	85.09
Botswana	0	47.66	64.12	71.50	78.68
Lesotho	0	42.15	49.50	65.02	76.32
Namibia	0	41.73	64.34	71.89	79.39
South Africa	0	45.00	57.11	68.16	77.57
Swaziland	0	41.41	49.18	62.28	75.73
Benin	0	33.68	59.20	65.58	72.61
Burkina Faso	0	30.94	58.07	67.69	75.49
Cabo Verde	0	48.06	72.97	79.94	87.22
Côte d'Ivoire	0	32.13	50.97	65.05	77.71
Gambia	0	30.23	59.83	66.44	72.36
Ghana	0	42.17	61.03	66.80	73.46
Guinea	0	33.06	58.04	70.68	80.32
Guinea-Bissau	0	35.87	54.72	63.64	71.82
Liberia	0	33.08	60.25	69.62	76.22
Mali	0	26.96	57.23	71.16	80.49
Mauritania	0	38.59	62.77	67.47	72.73
Niger	0	34.99	60.65	70.92	77.31
Nigeria	0	34.00	52.29	62.34	73.49
Senegal	0	35.47	65.81	75.89	84.92
Sierra Leone	0	28.75	50.19	62.08	70.16
Togo	0	35.29	59.01	70.14	77.65

Table 5: Longevity (Source World Population Prospect 2015, Available: https://esa.un.org/unpd/wpp/)

GDP (current US$)																	
Country Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	CAGR
World	33321	33134	34418	38656	43535	47121	51045	57543	63088	59793	65612	72818	74373	76363	78089	73502	5.1%
Nigeria	46	44	59	68	88	112	145	166	208	169	369	412	461	515	568	481	15.7%
Egypt, Arab Rep.	100	98	88	83	79	90	107	130	163	189	219	236	276	286	301	331	7.8%
South Africa	136	122	115	175	229	258	272	299	287	296	375	417	397	366	350	313	5.3%
Algeria	55	55	57	68	85	103	117	135	171	137	161	200	209	210	214	167	7.2%
Angola	9	9	12	14	20	28	42	60	84	75	82	104	115	125	127	103	16.3%
Morocco	39	39	42	52	60	62	69	79	93	93	93	101	98	107	110	100	6.1%
Sudan	12	13	15	18	21	27	36	46	55	53	66	67	63	66	74	84	12.8%
Kenya	13	13	13	15	16	19	26	32	36	37	40	42	50	55	61	63	10.6%
Ethiopia	8	8	8	9	10	12	15	20	27	32	30	32	43	48	56	62	13.4%
Tanzania	10	10	11	12	13	17	19	22	27	29	31	34	39	44	48	45	9.7%
Tunisia	21	22	23	27	31	32	34	39	45	43	44	46	45	46	48	43	4.4%
Ghana	5	5	6	8	9	11	20	25	29	26	32	40	42	48	39	38	13.5%
Congo, Dem. Rep.	19	7	9	9	10	12	14	16	19	18	21	24	27	30	33	35	3.9%
Cote d'Ivoire	11	11	12	15	17	17	18	20	24	24	25	25	27	31	34	32	7.0%
Cameroon	9	10	11	14	16	17	18	20	23	23	24	27	26	30	32	29	7.4%
Libya	38	34	20	26	33	47	55	68	87	63	75	35	82	66	41	29	-1.7%
Uganda	6	6	6	6	8	9	10	12	14	18	20	20	23	25	27	26	9.5%
Zambia	4	4	4	5	6	8	13	14	18	15	20	23	26	28	27	21	11.7%
Mozambique	5	5	5	6	7	8	8	9	11	11	10	13	15	16	17	15	6.9%
Botswana	6	5	5	8	9	10	10	11	11	10	13	16	15	15	16	14	5.9%
Gabon	5	5	5	6	8	9	10	12	16	12	14	18	17	18	18	14	6.7%
Zimbabwe	7	7	6	6	6	6	5	5	4	8	9	11	12	13	14	14	4.7%
Senegal	5	5	5	7	8	9	9	11	13	13	13	14	14	15	16	14	7.0%
Mali	3	3	4	5	5	6	7	8	10	10	11	13	12	13	14	13	9.8%
Namibia	4	4	3	5	7	7	8	9	8	9	11	12	13	13	13	12	7.0%
Mauritius	5	5	5	6	6	6	7	8	10	9	10	11	11	12	13	12	5.9%
Burkina Faso	3	3	3	4	5	5	6	7	8	8	9	11	11	12	13	11	9.4%
Chad	1	2	2	3	4	7	7	9	10	9	11	12	12	13	14	11	13.8%
Madagascar	4	5	4	5	4	5	6	7	9	9	9	10	10	11	11	10	6.1%
Equatorial Guinea	1	1	2	2	4	8	9	11	16	10	13	17	18	17	16	9	14.7%
South Sudan	0	0	0	0	0	0	0	0	16	12	16	18	10	13	13	9	NA
Congo, Rep.	3	3	3	3	5	6	8	8	12	10	12	14	14	14	14	9	6.3%
Benin	3	3	3	4	5	5	5	6	7	7	7	8	8	9	10	8	7.7%
Rwanda	2	2	2	2	2	3	3	4	5	5	6	6	7	8	8	8	10.1%
Niger	2	2	2	3	3	3	4	4	5	5	6	6	7	8	8	7	9.0%
Guinea	3	3	3	3	4	3	3	4	5	5	5	5	6	6	7	7	5.2%
Malawi	2	2	3	3	3	4	4	4	5	6	7	8	6	6	6	7	8.6%
Somalia	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	6	NA
Sierra Leone	1	1	1	1	1	2	2	2	3	2	3	3	4	5	5	4	13.0%
Swaziland	2	1	1	2	2	3	3	3	3	3	4	5	5	5	4	4	6.3%
Togo	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	4	7.3%
Burundi	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	8.2%
Liberia	1	1	1	0	0	1	1	1	1	1	1	2	2	2	2	2	8.8%
Central African Republic	1	1	1	1	1	1	1	2	2	2	2	2	2	1	2	2	3.2%
Seychelles	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5.5%
Guinea-Bissau	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	6.8%
Comoros	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	-100.0%
Djibouti	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0	-100.0%
Eritrea	1	1	1	1	1	1	1	1	1	2	2	3	0	0	0	0	-100.0%
Gambia, The	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	-100.0%
Lesotho	1	1	1	1	1	1	1	2	2	2	2	3	2	2	2	0	-100.0%
Mauritania	1	1	1	2	2	2	3	3	4	4	4	5	5	6	5	0	-100.0%
Sao Tome and Principe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
GDP Total Africa 1960-2015	**615**	**585**	**592**	**718**	**861**	**1009**	**1169**	**1365**	**1617**	**1537**	**1946**	**2143**	**2303**	**2395**	**2469**	**2233**	**8.4%**

Figure 6: GDP (Source: (Source: The World Bank, http://databank.worldbank.org/data/reports.aspx?source=africa-development-indicators)

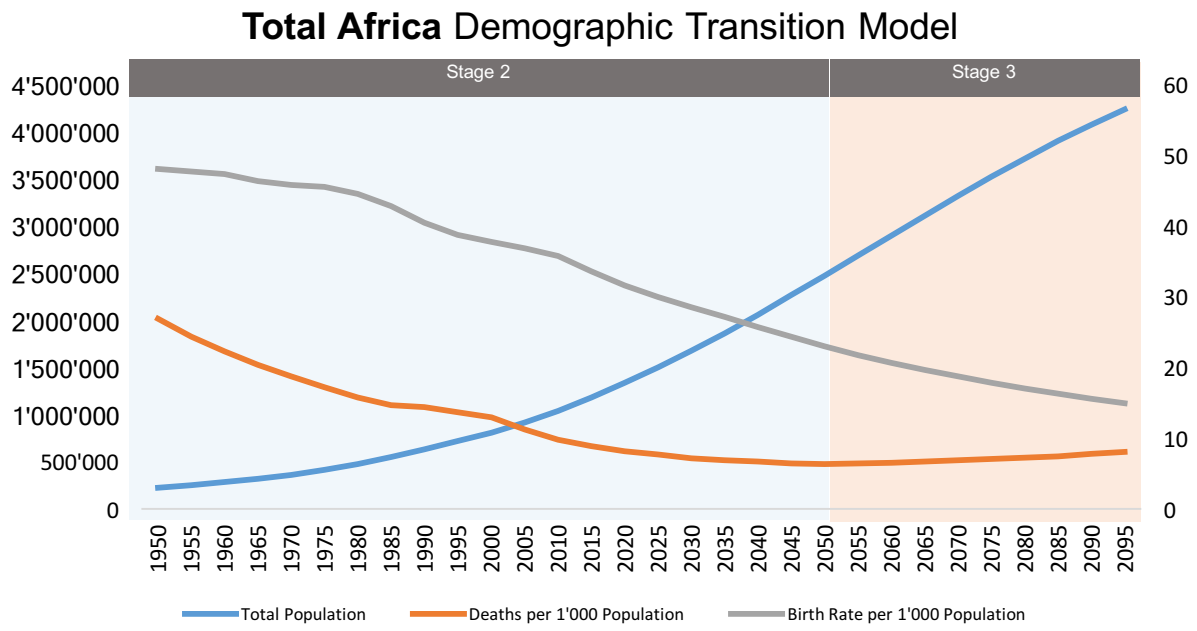


Figure 1: State of Demographic Transition (Source: World Population Prospect 2015, Available: https://esa.un.org/unpd/wpp/)

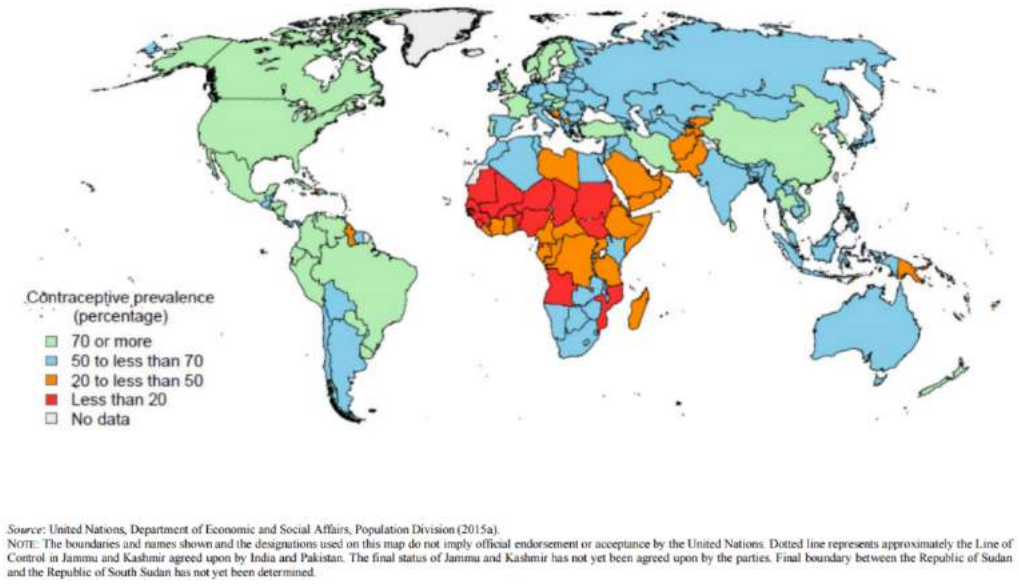
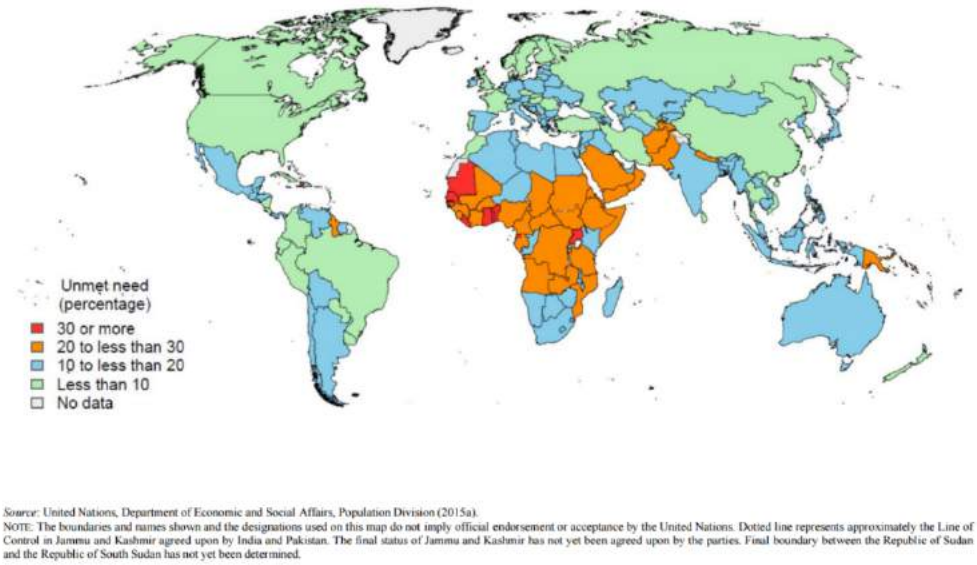


Figure 2: Percentage of women using any method of contraception among those aged 15 to 49 who are married or in a union, 2015. (Source: http://www.un.org/en/development/desa/population/publications/pdf/family/trendsContraceptiveUse2015Report.pdf)



Source: United Nations, Department of Economic and Social Affairs, Population Division (2015a).
NOTE: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.

Figure 3: Figure 3 : Percentage of women with an unmet need for family planning among those aged 15 to 49 who are married or in a union, 2015 (Source: http://www.un.org/en/development/ *desa/population/publications/pdf/family/trendsContraceptiveUse2015Report.pdf*

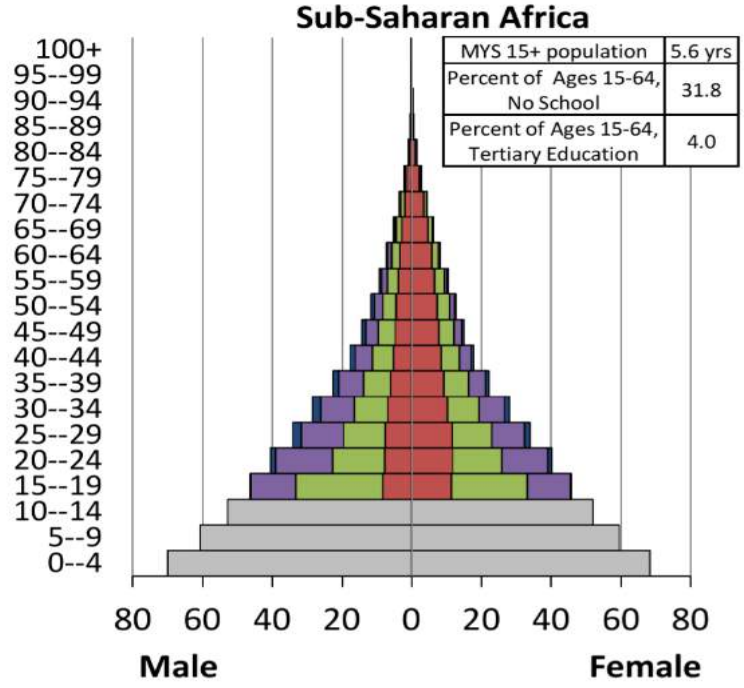


Figure 4: Education Profile in 2010 (Source Eberstadt, N. (2016), Wittgestein Ventre for Demography and Global Human Capital (2014). Available at: www.wittgesteincentre.org/dataexplorer., accessed July 23,2015)

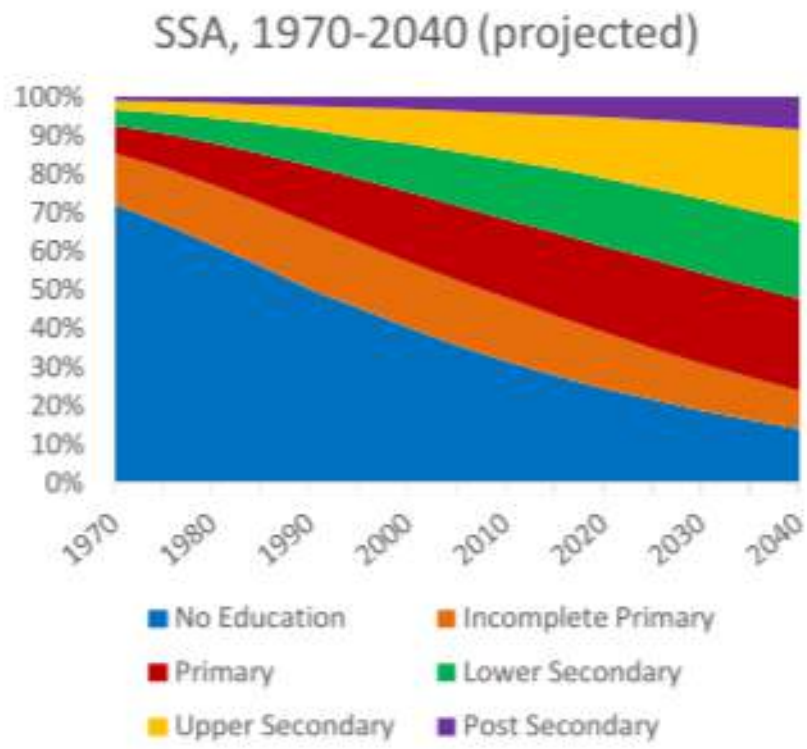


Figure 5: Educational Profile of Working Age (15-64) in Sub-Saharan Africa 1970-2040 (wittgenstein Centre estimates and projections), (Source: Eberstadt, N. (2016), Wittgenstein Centre for Demography and Global Human Capital (2014). Available at: http://witt.null2.net/shiny/wittgensteincentredataexplorer/ accessed June 9, 2015)

B. Demographic Picture of Cambodia to 2035

by Charlotte Reber, Guillaume Le Breton

This paper discusses projections of the demographic image of Cambodia until 2035. Key evolutions in the macro-environment as well as the legacy of the Khmer Rouge period are discussed in a PESTEL analysis. A detailed study of past and upcoming trends in terms of fertility, mortality and migration leads to the conclusion that Cambodia is currently in the end of the third phase of its demographic transition and will have entered the fourth stage by 2035. With a population increasing from around 16 to 20 million, combined with a decreasing dependency ratio, Cambodia will be facing a demographic window of opportunity, which has the potential to substantially boost its development, if properly leveraged by effective investments in education, health care, employment and productivity.

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1. INTRODUCTION

"Only 45 doctors were thought to have survived the Pol Pot regime in-country" (Liljestrand & Sambath, 2012, p.64). Such a shocking number mirrors the importance of the Khmer Rouge period on the demographics of Cambodia. More than thirty years after, the consequences are still observable and the legacy of this period will extend to many more decades. Cambodia is therefore, sadly, a unique case study in the fields of demographics. This paper aims to discuss demographic projections for Cambodia until 2035.

From a broader perspective, demographic change is one of the mega-trends affecting societies around the world, and will by definition gain on importance. The transition theory, crafted by Notestein and Davis in the middle of the 1940s (Heuveline, 2003, p.3) structures the phenomenon in four stages. The first one, characterized by both high mortality and high fertility rates results in low population growth. Countries move to the second stage as their infant mortality rate decline, although fertility rates remain at a high level, thereby increasing the population growth. The third stage is characterized by a demographic opportunity resulting from diminishing fertility. Finally, countries, which are in the fourth stage of their demographic transition, face the challenge of ageing populations and increasing total dependency ratios (i.e. the proportion of 0-15 and 65+ to the 15-65 years old)(Groth, 2016, Slide 15).

The impacts of the demographic transition are numerous, complex, far-reaching and contingent to the stage towards which the country is currently evolving. As a consequence, the purpose of this paper is not to come up with an exact number of the population in Cambodia in 2035, but rather to discuss projections of this number and the assumptions on which they are based. In fact, "what is relevant to know is whether or not the number of schools, classrooms and teachers will have to increase by a given percentage to reach full education coverage in the future, the economy will have to generate jobs at a certain rate to reach low levels of unemployment, and a given quantity of new residential dwelling will have to be constructed to avoid housing shortages" (Population Projections for Cambodia, n.d., p.2).

The first section of this paper provides an overview of the demographic image of Cambodia in 2016. The following PESTEL analysis aims at identifying upcoming trends and evolutions in the macro-environment. Afterwards, the three main components determining the evolution of the population, meaning fertility, mortality and migration trends, are discussed. Finally, the

forecasted demographic image of Cambodia in 2035 is presented and concluding remarks are made.

2. Current demographic situation of Cambodia

As of end 2015, Cambodia counts a population of 15.6 million inhabitants with an annual growth rate currently at 1.6% (The World Bank, 2016). Estimations of the median age range between 22 and 24 years old, thereby indicating that Cambodia has a relatively young population. In fact, children and youth under 15 make out about 35% of the population, while the third-age above 65 years old currently only represents around 6% of the total population (National Institute of Statistics et al., September 2015*,* p.13). Women are expected to live 71 years while the current life expectancy at birth for men is of 67 years (Knoema, n.d.). Only one fifth of the Cambodian population lives in cities, and while the overall GDP per capita was of 1'070 USD in 2015 (The World Bank, 2016), a clear gap exists between rural and urban areas.

In terms of births, Cambodia deals with a fertility rate of 2.5 children per woman (World Population Review, n.d.). The crude birth rate is currently of around 23 per 1'000 population (Knoema, n.d.) (fertility trends will be discussed in more details in section 4.1). Regarding mortality, Cambodia sustains a crude death rate of 5 per 1'000 population (Knoema, n.d.). The country posts an infant mortality rate of 20 per 1'000 live births and an under-five mortality rate of around 24 (although estimates vary greatly regarding this figure)(World Population Review, n.d.) (mortality trends will be analysed in section 4.2.). Migration is the third key pillar to craft a population forecast. Surprisingly, migration seems to be of limited relevance in case of Cambodia, with net migration accounting for less than 1% of the total population (The World Bank, 2016) and representing a loss of 30'000 people a year (Worldometers, n.d.). Section 4.3 takes a closer look at this topic.

This brief overview of the current demographic image of Cambodia is highly affected by the Khmer Rouge legacy, as discussed later in this paper. In fact, "1970 population of 7.3 mio. would have grown up to 9.3 mio. in 1980 if the growth rate of 2.4% (period 1965-1970) would have been maintained" (CEPED, 2001, p.1). The dent visible in the population pyramid at the age categories 35 to 45 years old is due to the 2.5 million excess deaths (CEPED, 2001, p.1), which occurred during this period (see figure 3). Having lost about one third of its population between 1974 and 1979 (Heuveline, 2003, p.5), Cambodia is still bearing the costs of this mortality crisis and will have to do so in the upcoming decades as well.

Overall, it can be said that Cambodia is currently moving towards the end of the third stage of its demographic transition. This statement is supported by the continuous declines in the population growth rate (Rao, 2010, p.122), driven by declines in the fertility rates (National Institute of Statistics et al., September 2015, p.12). Additionally, Liljestrand and Sambath (2012) have noticed that the country has been shifting "from a young to an intermediate age population" since the beginning of the millennial (p.65). Therefore, the total dependency ratio has been falling, although it still remains relatively high, with a score of around 56% (The World Bank, 2016).

Based on this initial overview, the upcoming sections discuss trends and evolutions in the macro-environment as well as in the demography of Cambodia, so as to come up with a projection of the demographic situation of the country by 2035.

3. PESTEL Analysis

Demography depends on a large range of variables, which turned out to be difficult to bring together in a quantitative model. While demography experts may be able to come up with such complex statistical models to forecast future trends, a qualitative PESTEL analysis also provides an insightful *tour d'horizon* of how Cambodia's demography may be affected by its macroeconomic environment.

3.1 Political Analysis

Cambodia became independent from France in 1953 and is mainly a Buddhist country. It went through the genocide of Khmer Rouge period (1975-1979) which destroyed part of the infrastructure, witnessed the opening of work camps of a rare and gruesome violence. The regime imposed an inversion of values in favour of a rural, classless society and underwent a time of starvation for the population. Pol Pot's attempt to restart society from scratch in 1975 by destroying former social order was described by François Ponchaud (1977) as a "Year Zero" for the country (p.1). Only in 1993 was the regime following the Khmer Rouge period recognised as legitimate by the United Nations (Liljestrand & Sambath, 2012, p.65). Looking at international cooperation, Cambodia has a seat in major regional or global organisations such as ASEAN, UN, IMF or The World Bank. However, on-going government initiatives still have a long way to go to foster further development. State incentives can play a major role when it comes to shaping a country's demography but family planning remains a challenge. No doubt though, that the quality of healthcare is improving through government health

policies (see The World Bank, 2016). In fact, habits can be changed by proactive policies as shown by the government achievement to have most births delivered in government facilities as of 2012 compared to a majority of home births ten years before (Liljestrand & Sambath, 2012, p.62).

3.2 Economic Analysis

With regard to economic growth, the Gross National Income (GNI) has grown over the past years to reach 1'070 USD per capita in 2015 (The World Bank, 2016). The steady growth of GDP/capita at a rate of 7% since 2000 driven by construction and garment sectors contributes to better living standards. "Around 600'000 people, the majority of whom are women, are employed in the garment and footwear sector. An additional 500'000 Cambodians are employed in the tourism sector, and a further 50'000 people in construction. Tourism has continued to grow rapidly with foreign arrivals exceeding 2 million per year since 2007 and reaching around 4.5 million visitors in 2014" (CIA, n.d.). CNN reports the efforts of the government to become pro-business which supports its economic rise. "With labour costs cheaper than China and Vietnam, manufacturers are coming to Cambodia to cut costs (CNN News, 5 October 2011, 1:46). Total tourist arrivals in 2015 grew by 6.1% (reaching 4.78 million visitors), compared with 6.9% growth in 2014 (The World Bank, 2016). Growth in the agricultural sector is limited and volatile because of unfavourable climatic and environmental conditions. Nonetheless, access to credit is improving: domestic credit has in fact accelerated by 27% year-on-year in 2015 (The World Bank, 2016).

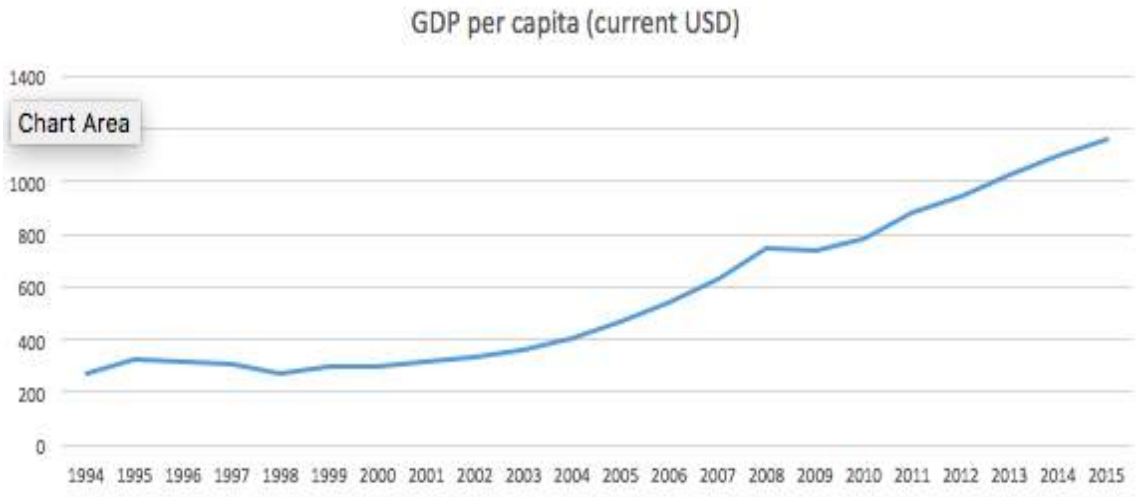

Figure 1: Cambodia's GDP per capita, current USD (The World Bank, 2016)

Looking forward, the Working Age Population (WAP) of Cambodia is expected to reach an all-time high in 2045 and should therefore benefit from the so-called “demographic dividend”, a concept, which will be developed later in this paper (see section 5).

3.3 Societal Analysis

In their socio-economic improvement report, Liljestrand and Sambath (2012) describe the improvement of living conditions in Cambodia as follows: “Background factors have included peace and stability, economic growth and poverty reduction, improved primary education, especially for girls, improved roads, improved access to information on health and health services via TV, radio and cellphones, and increased ability to communicate with and within the health system”(p.62).

Additionally, the weight of traditions varies between rural and urban areas and has an influence on the fertility rate, as discussed in part 4.1. Primary school attendance is increasing: the net primary school admission rate increased from 81% in 2001 to 95.3% in 2014”(The World Bank, 2016). This is a consequence of the state’s decision to allocate 73% of public expenditures in primary education (Bruni, 2013, p.40). Still, access to education remains very much unequal between men and women (highest gap of all ASEAN countries) with only 25% of women having access to secondary education compared with 41% for men in 2007 (Bruni, 2013, p.40). The poverty rate, defined by the OECD Library (2010) as the ratio of the number of people who fall below the poverty line, i.e. half the median household income, has fallen down to 17.7% in 2012. However, there is still a deep social gap between the cities and the countryside since about 90% of poor people live in rural areas (The World Bank, 2016).

Nevertheless society may be changing as the Internet, television and tourism display influential images of Western lifestyles. “General access to an increasing number of communications media – radio, TV, DVD, phone – have helped to expose remote and rural populations as well as urban ones to more and better information on health-related topics and new ways of doing things”(Liljestrand & Sambath, 2012, p.65). But social issues involving the well-being of women need to be addressed: “Several major challenges remain, including post-partum care, family planning, prevention and treatment of breast and cervical cancer, and addressing sexual violence against women, which need the same priority attention as maternity care”(Liljestrand & Sambath, 2012, p.62).

3.4 Technological Analysis

Access to the Internet has increased sharply since 2009 with a number of Internet users for 100 people growing from almost zero to 19 in 2015 (see Appendix 5)(The World Bank, 2016). The use of mobile phones is also increasing sharply. “In recent years, cellphone coverage has increased rapidly, and today most of the country has good phone coverage, with cellphones becoming ubiquitous throughout the country, rising from 8% of households in 2005 to 58% in 2010”(Liljestrand & Sambath, 2012, p.62). Medical technologies also account for a reduction of maternal and under-five mortality. However, Cambodia is lagging behind when it comes to high tech added value in manufacturing with a share of 0.26 compared to 21.9 and 77.6 for Vietnam and Singapore respectively (Bruni, 2013, p.42).

3.5 Environmental Analysis

Recycling and managing garbage enables people to live in cleaner places and reduces the risk of illness. Access to piped water remains an issue as 79% of the population (12.3 million people) do not have access to piped water supply and 58% (9.3 million people) did not have access to improved sanitation in 2015 (The World Bank, 2016).

The impact of El Nino is to be assessed but could represent a major risk for the agriculture. Nick Miller explains this global warming wave could delay the rainy season in South East Asia (Miller, 23 December 2015) thereby impacting harvesting seasons and yields. The CO2 emissions of the country have started growing slightly since 2006 and will probably keep on doing so as the country develops (see The World Bank, 2016). Finally, forests and natural resources are extensively exploited, causing “land grabbing” against a backdrop of Chinese influence. For example, “the opening up of a major sugarcane plantation in Kampong Speu province has required the forced eviction of existing farmers and communities” (Borras & Franco, 2011).

3.6 Legal Analysis

Assessing the reliability of the Cambodian administration according to the World Bank’s key metrics leads to the conclusion that Cambodia is a rather stable but corrupt and ineffective state (2016). On average, over the years 2005, 2010 and 2015, it ranks in the lower 20% of countries for corruption control, rule of law and government effectiveness. Corruption is all the more tricky to address in Cambodia as many members of the current government are

former Khmer Rouge members and have therefore grown a network of political leaders which protect and back each other, Bruno Carette argues in a France Inter Interview (2014).

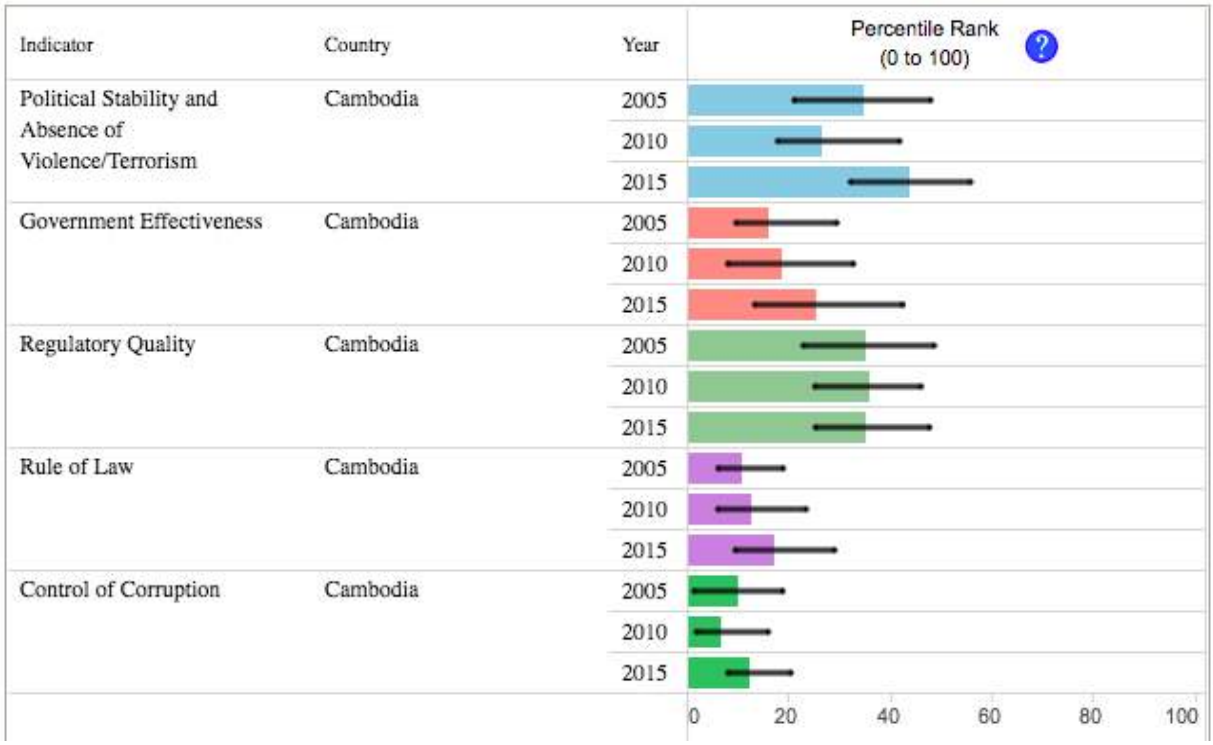

Figure 2: Cambodia's governance indicators (The World Bank, 2016)

4. Demographic trends in Cambodia

A country's fertility is the key driver of its population's growth over time. It is the first of the three main pillars of demography alongside with mortality and net migrations.

4.1 Fertility trends

Fertility in Cambodia has been declining over the past decades and its average TRF (Total Fertility Rate) was of 2.7 children per bearing women over the period 2011-2013, down from 3.4 a decade earlier (2005-2014)(National Institute of Statistics et al., 2015, p.67). Distinctions between sub-groups can provide interesting insights to better identify the drivers lying behind this decline.

To start with, the total fertility rate is influenced by high fertility rates in rural areas. In fact, the TFR in rural areas was at 2.9 children per women over the 2011-2013 period, while it only

reached 2.1 in urban areas. This is particularly striking for 15 to 19 years-old mothers for which the fertility rate is three times as high in the countryside as in cities (National Institute of Statistics et al., 2015, p.68).

With no surprise, there is also a correlation between fertility and wealth of the family – the top quintile of wealthy families has on average 2.2 children per women while the lowest quintile has 3.8. To get a dynamic view of how fertility is evolving, one can compare the fertility of age-specific groups of women over time. It becomes clear that in almost all sub-categories, fertility has gone down over the last two decades, confirming that it is a structural trend across the Cambodian society (National Institute of Statistics et al., 2015, p.69).

Finally, Cambodian mothers also give birth later on average since the median age at first childbearing has increased, which is in line with the decrease of the TFR. In other words, fertility rates are decreasing while first births arrive later in women's lives.

The weight of history is key to understand the current Cambodian age pyramid. The fact that the fertility rate became very low during the Khmer Rouge period (1975-1979) combined with a high mortality rate carved a dent in the age pyramid still observable today (see Figure 3). After the Khmer Rouge, from 1979 on, there was a surge of fertility due to the end of terror, hope for social peace and the fact that families could be united again. It would be tempting to talk about a "baby boom". However, Cambodia's fertility rate remained high for a long period of time while a baby boom typically sees the fertility rate declining rapidly again in the years following the boom (see Heuveline, 2003, p.5).

4.2 Mortality trends

Analysing mortality patterns and their evolution is a key step when forecasting the demographic situation of a country. In the particular case of Cambodia, the painful legacy of the civil war and the Khmer Rouge regime can still be perceived nowadays. As mentioned above, the 2016 population pyramid (see Figure 3) presents an important deficit in the male cohort aged from 35 to 44 years old (National Institute of Statistics et al., September 2015, p.12).

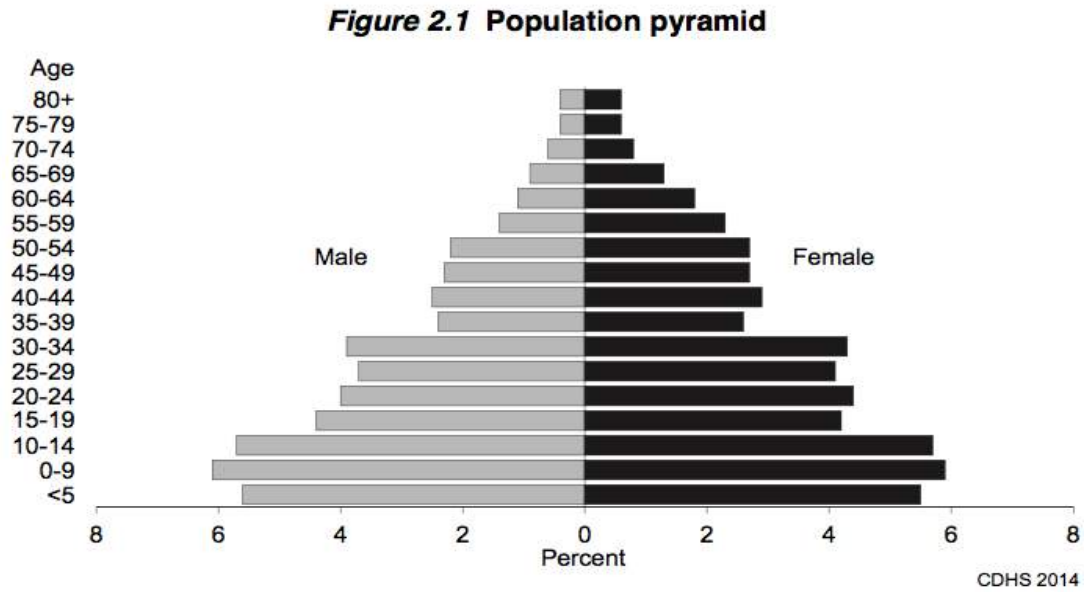

Figure 3: Cambodia's population pyramid (Demographic and Health Survey, 2014, p.12)

This is the consequence of the 2.5 million excess deaths, which occurred from 1970 to 1979. Among these, 1.4 million were violent deaths primarily affecting males (Heuveline, 1998 as cited in CEPED, 2001, p.1) and concentrated over the years 1974 to 1979 (De Walque, 2004, p.5), which were then qualified as genocide (De Walque, 2004, p.1). Overall, "about a third of the Cambodian population may well have died during this decade as a direct or indirect result of the Cambodian civil war, the American-Vietnamese war, the Khmer Rouges' violent regime, the famine, or the Vietnamese invasion" (Heuveline 1998; Kiernan 1996; Sliwinski 1995 as cited in Heuveline, 2003, p.5). The Khmer Rouge regime targeted primarily the urban, educated, upper class (Heuveline, 2003, p.7 and De Walque, 2004, p.7) but in the end, the whole population was affected, with "national estimates of 32% loss for males over age 20 and 21% loss for females over age 20" (adapted from Heuveline 1998 as cited in Heuveline, 2003, p.7). The older cohort was also highly affected (Heuveline, 2003, p.8), just like children, by the famine and poor health conditions that occurred on top of violence (De Walque, 2004, p.5). "A child born between 1975 and 1979, had a 14.8 percent risk of dying within his first year of life and a 22 percent chance not to make it until his fifth birthday" (De Walque, 2004, p.8). Figure 4 below shows the impact of the Khmer Rouge's period over the crude death rate and its steady decline since then.

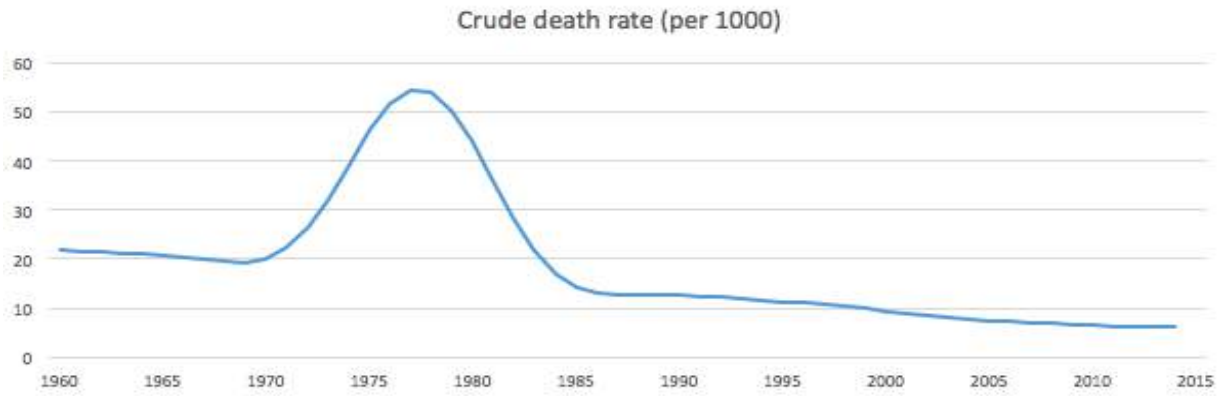

Figure 4: Crude death rate per 1000 (The World Bank, 2016)

According to the 2016 estimations and despite the flattening of its curve (see Figure 4), the crude death rate is expected to decrease until about 5.83 per 1'000 population (World Population Review, n.d.). This evolution is consistent with the shift towards the end of the third stage of a country's demographic transition (Rao, 2010, p.122). For the overall population, the Cambodian Demographic and Health Survey reported 6.2 deaths per 1'000 births in 2005 (Population Projections for Cambodia, n.d., p.4). But even more than the total crude death rate, maternal and child mortality rates and their respective evolution are of interest for the development of the country as a whole.

The maternal mortality rate reflects the risk associated with each live birth (National Institute of Statistics et al., September 2015, p.124). "Maternal deaths are defined as any death that occurred during pregnancy, childbirth, or within six weeks after the birth or termination of a pregnancy" (National Institute of Statistics et al., September 2015, p.123). "Maternal mortality has been significantly falling in Cambodia since 2005 though it had been stagnant for at least 15 years before that" (Liljestrand & Sambath, 2012, Abstract).

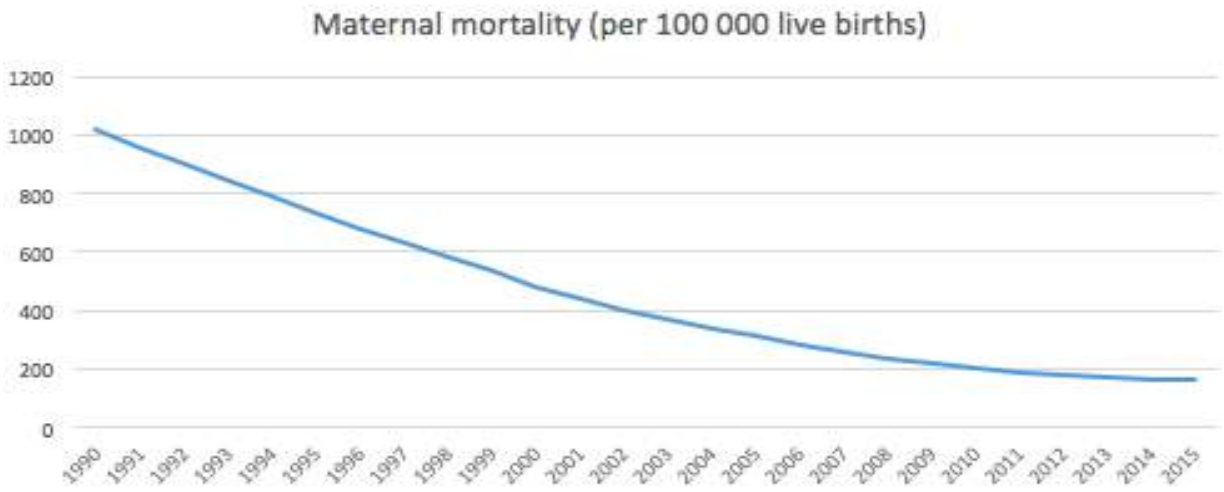

Figure 5: Maternal mortality per 100 000 live births (The World Bank, 2016)

The maternal mortality ratio was in fact halved between the period 2000-2005 (472 per 100'000 live births) and the period 2006-2010 (206 per 100'000 live births)(see Figure 5)(Liljestrand & Sambath, 2012, Abstract). Apparently, the significant drop in maternal mortality actually occurred between 2005 and 2010 (National Institute of Statistics et al., September 2015, p.124). According to the Cambodia Demographic and Health Survey run in 2014, the 170 maternal deaths per 100'000 live births recorded for the seven-year period preceding the survey was lower than the one measured in 2010, although not significantly lower (National Institute of Statistics et al., September 2015, p.121). Nevertheless, the improvements made in terms of maternity care facilities and of capacity and quality of the services provided in governmental facilities shouldn't be neglected (Liljestrand & Sambath, 2012, p.70).

Another important component contributing to the overall crude death rate is child mortality. In fact, "infant and child mortality rates reflect a country's socioeconomic situation as well as the quality of life of the population under study" (National Institute of Statistics et al., September 2015, p.127). Regarding this matter, three main figures are usually considered: the infant mortality, defined as the probability of dying between birth and the first birthday, the child mortality, defined as the probability of dying between the first and the fifth birthday, and the under-five mortality, defined as the probability of dying between birth and the fifth birthday (National Institute of Statistics et al., September 2015, p.127). The Census conducted in 2008 recorded an infant mortality rate of 60 per 1'000 births (see Figure 6) (Rao, 2010,

p.122), which is still above the Millenium Development Goal of 50 for male and 43 for female (Population Projections for Cambodia, n.d., p.7).

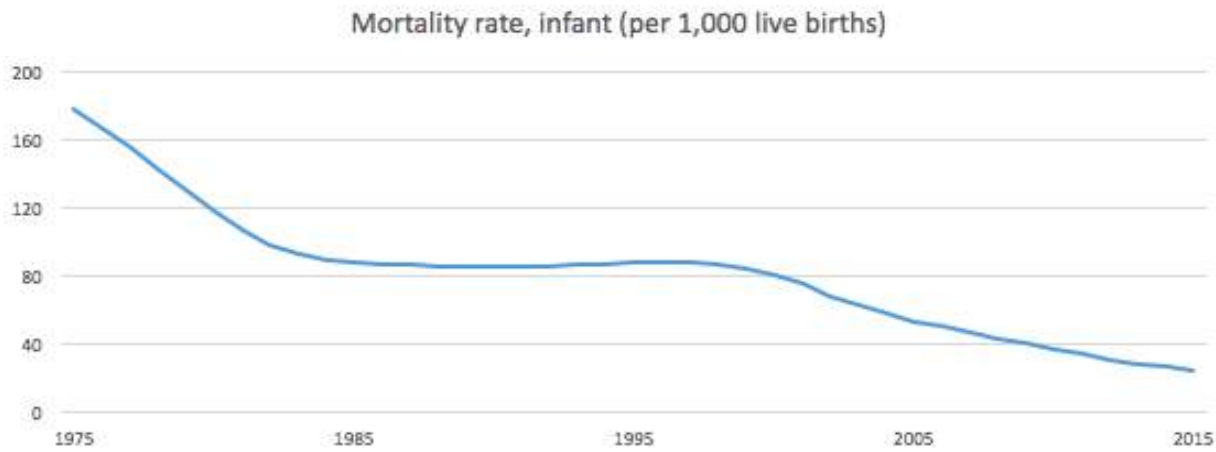

Figure 6: Infant mortality rate per 1000 live births (The World Bank)

This figure should be interpreted under the lens of a clear declining trend in the Infant Mortality Rate (IMR) in Cambodia (Population Projections for Cambodia, n.d., p.5). In fact, "infant mortality declines from 45 to 28 deaths per 1'000 live births between the 2010 CDHS and the 2014 CDHS" (National Institute of Statistics et al., September 2015, p.127). Estimates for 2016 present an infant mortality rate of 20.44 per 1'000 live births. With regards to the under-five mortality, a decrease from 54 to 35 per 1'000 live births was registered between 2010 and 2014 (National Institute of Statistics et al., September 2015, p.127). In general, infant and child mortality are influenced by several socioeconomic factors affecting households and mothers. For instance the rural under-five mortality ratio is about three times higher than the urban one (ranges of 42-52 per 1'000 live births versus 13-18)(National Institute of Statistics et al., September 2015, p.130). Differences in the level of the mother's education also create a large gap in infant mortality rates (National Institute of Statistics et al., September 2015, p.131). Finally, "children born in poorer households suffer higher mortality than these born in wealthier households" (National Institute of Statistics et al., September 2015, p.131).

After a severe mortality crisis followed by significant declines in mortality rates, Cambodia seems to have stabilized its crude death rate, which constitutes a major step in a country's demographic transition.

4.3 Migration trends

Migration is the third main pillar influencing the evolution of the population and thus the demographic image of a country.

The topic of migration in Cambodia has mainly been addressed in the literature when reviewing the Khmer Rouge period. In fact, many Cambodian escaped the country during the civil war and exiled themselves in neighbour countries such as Thailand and Vietnam (De Walque, 2004, p.4). Additionally, it is estimated that between 1975 and 1979, around 300'000 Vietnamese and other foreigners were expelled from the country (CEPED, 2001, p.1). The post-war times were also affected by exceptionally high migration flows. In 1980, 140'000 Khmer Rouge took refuge in camps in Thailand (CEPED, 2001, p.1). Whereas the gross migration rate was of 1.5 per 1000 inhabitants in the 1980s, it reached 9 to 1'000 in the years 1990 to 1995 (see Figure 8)(CEPED, 2001, p.1). Returns from Vietnam and Thailand account for this increase (CEPEP, 2001, p.1), thereby indicating how long it took the civil population exiled abroad to overcome the trauma of this civil war.

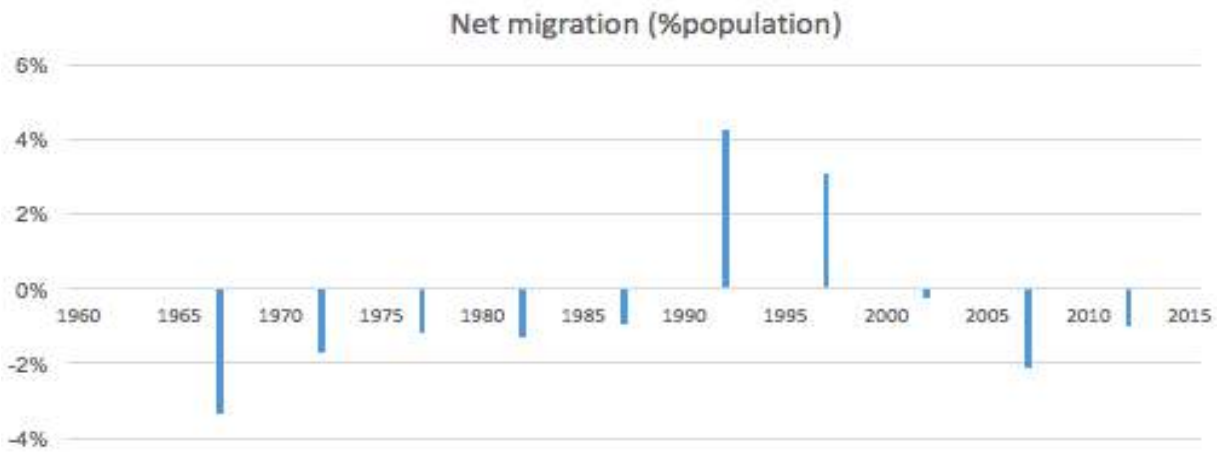

Figure 7: Net migrations (percentage of population) (The World Bank)

Regarding the current migration trends, the Census of 2008 estimates that the net migration in Cambodia accounts for less than 1% of the population (see Figure 7)(Rao, 2010, p.122). In fact, it appears that, in the specific case of Cambodia, migration isn't a key factor to consider since it neither has a significant impact on the demographics nowadays nor is it expected to gain considerable weight in the future. As a consequence, international migration is even omitted in some population projections since "it is improbable that [it] will become a major component of the population dynamic of the country" (Population Projections for

Cambodia, 2008-2030, p.6). In several population forecasts, net migrations are estimated to remain at the constant level of -30'000 people per year (Worldometers, n.d.). Nevertheless, these findings may be biased by the fact that the projections considered do not seem to account for illegal, and thus non-reported migration flows.

Although international migrations do not appear to play a key role in the demographics of Cambodia, internal migrations within the borders have been important in the past decades and may still become even more significant in the future. In the 1998 Census, 31.5% of the population reported to have migrated at some point and 10% said to have done so in the past 5 years (CEPED, 2001, p.3). Although the global trend of rural exodus probably influences these figures, in the case of Cambodia, it is important to remember that the civil war lead by Khmer Rouge emptied the cities, which were therefore crowded by almost 60% of (internal) migrants by the beginning of the millennial (CEPED, 2001, p.3).

All in all, the net migration rate of Cambodia is not to be considered a key figure when discussing the demographic image of the country to 2035. Nevertheless, the relevance of high internal migration rates and their influence on the urban-rural ratio among other figures should not be underestimated.

Based on the PESTEL analysis and the demographic studies discussed in the previous sections, the upcoming one aims at presenting a projection of the Cambodian population in 2035 as well as the implication of this demographic transition on the development of the country as a whole.

5. Demographic image of Cambodia to 2035

Metrics	**2015**	**2035**
Population (million)	15.6	19.9 - 20.1
Population growth	1.6%	1.0%
Life expectancy	Men: 66 ; Female: 70	Men: 73; Female: 78
Total fertility rate (TFR)	2.6 children/women	2.1 children/women

Crude fertility rate	23/1000 people	17/1000 people
Crude death rate	5.9/1000 people	5.6/1000 people
Median age	24	30
Infant mortality rate	20/1000 people	6/1000 people
Under-5 mortality rate	27/1000 people	7/1000 people
Net migrations	-30 000	-30 000
Total dependency ratio	56%	50%
Old-age dependency ratio	7%	12%
Density of pop. (per sqm)	90	113

Table 1: Cambodia's demographic image key forecasts (Own table based on data retrieved from The World bank (2016) and other online databases (Knoema, World Population Review, Worldometers, Fact Fish and Wikipedia)

By 2035, the population of Cambodia will be ranging between 19.9 and 20.1 million (World Population Review, n.d. & Fact Fish, n.d.) while the annual growth rate will have decreased to 1.0% and the median age will be up to 30 years old (Worldometers, n.d.)(see Table 1). Given the fact that in 2016, around half of the population is younger than 20, this evolution represents an important step towards an ageing population (Population Projections for Cambodia, n.d., p.8-9). In line with the PESTEL analysis which forecasts an improvement of healthcare services, Cambodian men and women will be living longer and their life expectancies will have increased to 73 and 78 years old respectively (Knoema, n.d.). Projections estimate the fertility rate to be down to 2.1 by 2035, mirroring the change in social behaviours announced in the societal analysis above (see section 3.3). The infant mortality rate is expected to decrease dramatically from 20.4 to 6 per 1'000 live births (World Population Review, n.d. & Knoema, n.d.).

A significant decrease in the crude fertility rate between 2016 and 2035 (from around 23 to 17) combined with a much flatter crude death rate (which has slightly decreased from 5.9 to 5.6 over the same period) indicates that Cambodia will have entered the fourth phase of its demographic transition by the end of the forecast period.

More interestingly, the falling dependency ratio, which results from a change in the population structure generated by higher child survival, more common family planning and better education for girls mark the beginning of a demographic bonus period. “This means that in the coming 40 years Cambodians aged 15–64 will be proportionately caring for fewer children and older people, leaving more room for national development and education” (Liljestrand & Sambath, 2012, p.65). Also called demographic dividend, this phenomenon represents a window of opportunity for a country’s development, starting with the decline in the proportion of young children and closing with the rapid increase in the proportion of the elderly (Population Projections for Cambodia, n.d., p.9). The population will thus keep on rising despite the falling fertility rates. This is due to the fact that the Cambodians born during the high-fertility periods following the Khmer Rouge regime (see section 4.1) will reach their reproductive age simultaneously. Therefore, even though they might have fewer children each (meaning that fertility rates will be ranging around the replacement level), the total population will continue to grow because of the number of women in their reproductive age (Population Projections for Cambodia, n.d., p.8).

Caused by a change in the population structure, this demographic bonus can only be captured through investments in health, education, productivity and women employment (Population Projections for Cambodia, n.d., p.9). In fact, declines in fertility can lead to increased participation of women in the workforce, which will support the family income, nutrition and health. Additionally, families with fewer members usually have to take care of less children and elderly people and can therefore invest more in each child. At a macroeconomic scale, these changes have the potential to substantially boost the socio-economic development of Cambodia if they are properly leveraged through the relevant investments (Population Projections for Cambodia, n.d., p.9). The flip side of the coin is that the so-called demographic dividend could well jeopardise present growth and lead to social unrest, should the government fail to provide enough jobs for the generations to come. With high pressures on salaries and growth depending on foreign investments and low value added sectors as shown in the PESTEL analysis, one of Cambodia’s upcoming challenges is to invest enough in education, infrastructures and health to raise salaries and create new jobs.

Finally, one can wonder whether the Khmer Rouge slaughter still has an impact on Cambodia's 2035 demographic picture. If it does, is it still really a burden? Looking at Cambodia's current age pyramid (Figure 3), a dent on all age groups older than 35 is clearly visible (age threshold from which Cambodians have experienced the Khmer Rouge regime). Consequently, there is today a deficit of mid-age and elderly people compared to the hypothetical age pyramid that would have been crafted if the genocide would not have happened. A few years ago, the deficit was mainly composed of mid-age people thereby representing a real burden for the Cambodian economy. However, as time is going by, this deficit is more and more composed of old people, who would have increased the dependency ratio. So one could argue that, after being a burden, the dent now contributes to improve the dependency ratio of Cambodia, thereby leveraging the demographic bonus and postponing the ageing population phenomenon.

Looking even further in the future, the demographic bonus will come to an end as soon as the massive wave of young Cambodian adults will reach 65 and retire, just like today in European countries. Demographic waves seem to be inevitably disruptive - after the bonus comes the aging and its related challenges.

6. SUMMARY

This final section aims to conclude the present paper with a summary of findings, a brief discussion of limitations and suggestions for further research.

6.1 Summary

This paper has analysed the current demographic image of Cambodia and its prospected evolution to 2035. The PESTEL analysis has provided valuable insights regarding the macro-environment in which the population lives. While economic prospects are promising, significant improvements still remain to be done in terms of political and legal stability to support the social and technological development of the country, while tackling ecological challenges.

From 15.8 million in 2015, the total population is expected to grow to almost 20 million by the time horizon set (i.e. 2035). The median age will have increased by 6 years and both women and men will be expected to live several years longer. While the total crude death rate will slightly be reduced, significant drops are expected in infant and child mortality rates. Finally,

fertility rate will be decreasing, thereby confirming that Cambodia will have entered the fourth stage of its demographic transition by 2035.

The two upcoming decades have the potential to become a key turning point in the development of the country. In fact, high fertility rates of the past combined with low old-dependency ratios and current decreasing fertility rates, offer the country the possibility to harvest a demographic dividend, which will boost its socio-economic development. Interestingly, the painful legacy of the Khmer Rouge could appear supportive since it might artificially reduce the dependency ratio around the same period.

Grabbing such an opportunity (i.e. realizing the demographic bonus) however requires effective investments in health, education and employment. And this is where the real contribution of demographics lies: “Projections are not instruments to predict the future but to construct the future” (Population Projections for Cambodia, n.d., p.2).

6.2 Self Criticism / Limitations

This paper presents several flaws and limitations. First of all, it relies on existing projections of Cambodia’s population. Despite the quality and variety of sources and references taken into account, most of the analyses rely on the data collected through the governmental Census and/or through the Cambodia Demographic and Health Survey. Despite the development of more reliable and of indirect methods, researchers still suspect a “very important under-numeration of death and thus of mortality” (Population Projections for Cambodia, n.d., p.4). Liljestrand and Sambath (2012), for instance, consider that only 20 to 30% of maternal deaths are reported (p.69). Similarly, the authors of this paper expect the migration figures to be significantly undervalued due to illegal migration flows. Nonetheless, the most reliable projections take into account this issue and adjust for under-enumeration in their analyses (Population Projections for Cambodia, n.d., p.6). It is important to notice that although the online databases used may seem of poor quality at first, the fact that they are based on United Nations data is the reason why they have been included in this paper.

Secondly, after considering developing an own forecasting model, it has been agreed that, given the resources and competences at hand, relying on existing projections would lead to more reliable and valid results. The authors thus believe to have delivered great value by putting these existing projections into perspective and discussing them to come up with an overview of a plausible demographic image of Cambodia by 2035.

6.3 Outlook on Further Research

In order to analyse the demographic trends of Cambodia in a more comprehensive way, further research may focus on the internal and external migration flows of Cambodian people. In fact, the low relevance of this topic in the existing projections is surprising given the socio-economic situation of the country. It might be thus of interest to study the illegal or unreported migration flows and to integrate them in these projections.

Additionally, in order to better understand the legacy of the Khmer Rouge period, further research may compare Cambodia with similar neighbour countries such as Thailand, Vietnam or Laos to identify key differences in their demographic trends that might be the long-term consequences of this murderous period. On top of that, psychologists and anthropologists may also want to look at the effect of the civil war, and of the fact that former Khmer Rouge politicians are still governing the country today, on the population's culture, lifestyle and mental reasoning.

Last but not least, the demographic window of opportunity that Cambodia is facing should be subject to monitoring and analysis, in order to check whether the country is making the relevant investments to be able to harvest this demographic dividend. If this is not the case, researchers will be able provide the relevant stakeholders with reports and data that will help the country make a significant step in its socio-economic development.

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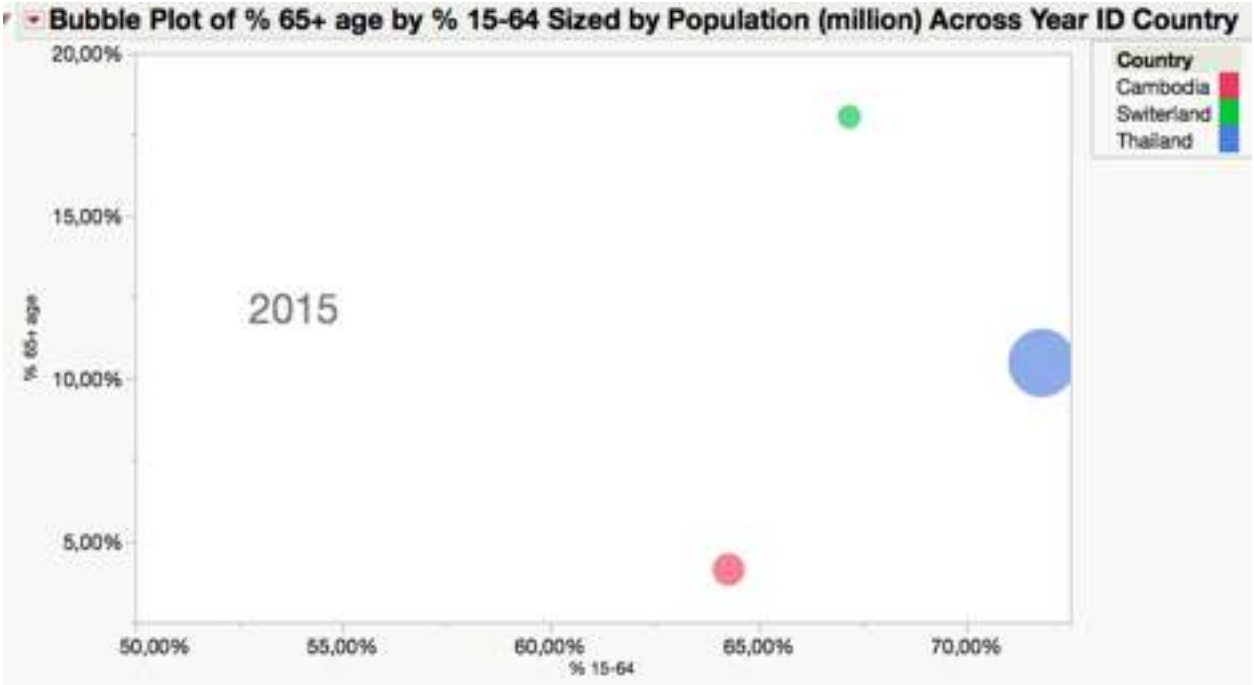
8. APPENDICES

Appendix 1: JUMP software - Dynamic comparison of dependency ratios of Cambodia, Thailand and Switzerland over time (1960-2015) (The World Bank, 2016)

JUMP is a software, the use of which is taught at HSG at a Master's level in Research in Management. It enables to design animations of data over time and to highlight a phenomenon with striking visual evidence. The bubble plot below is a screenshot of a live animation created by the authors and which will be displayed during the course's seminar to show how Cambodia's dependency ratio evolved compared to Thailand and Switzerland. With the percentage of 15-64-year-old people on the x-axis and the percentage of 65+ year-old people on the y-axis, the result of the animation on the 1960-2015 time span is a dramatic shift of Cambodia from the bottom left to the bottom right following Thailand while Switzerland moves like all ageing countries from the bottom right to the upper-right part of the matrix over time.

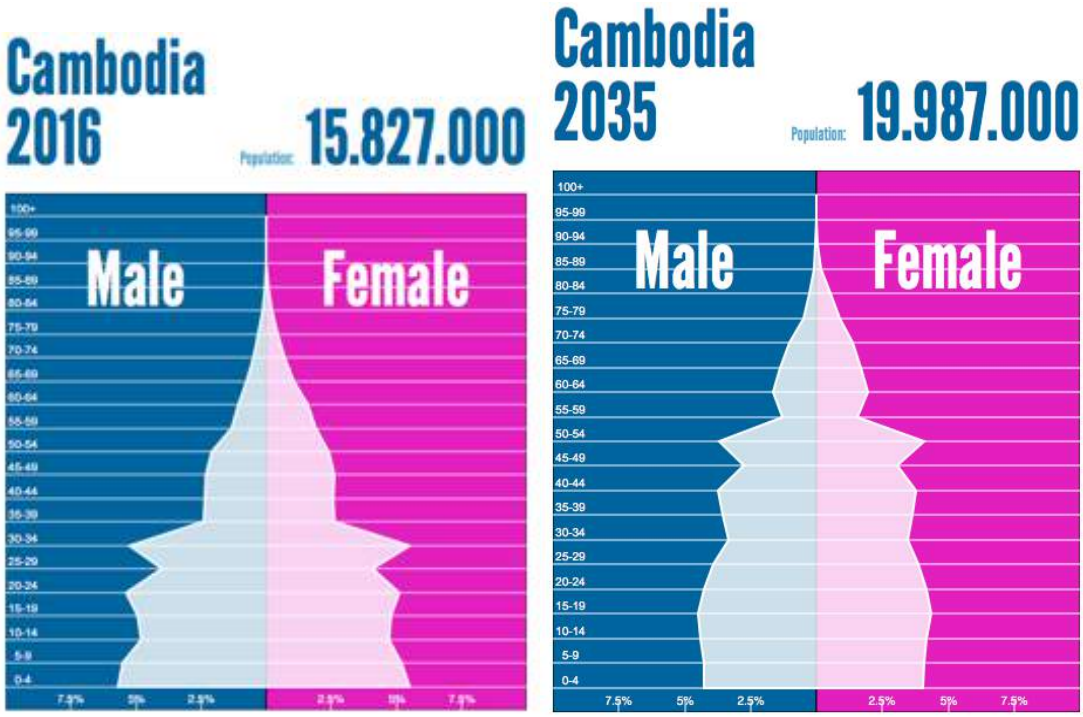


Appendix 2: Cambodia's working age population expected to grow until 2045 (Bruni, January 2013, p.19)

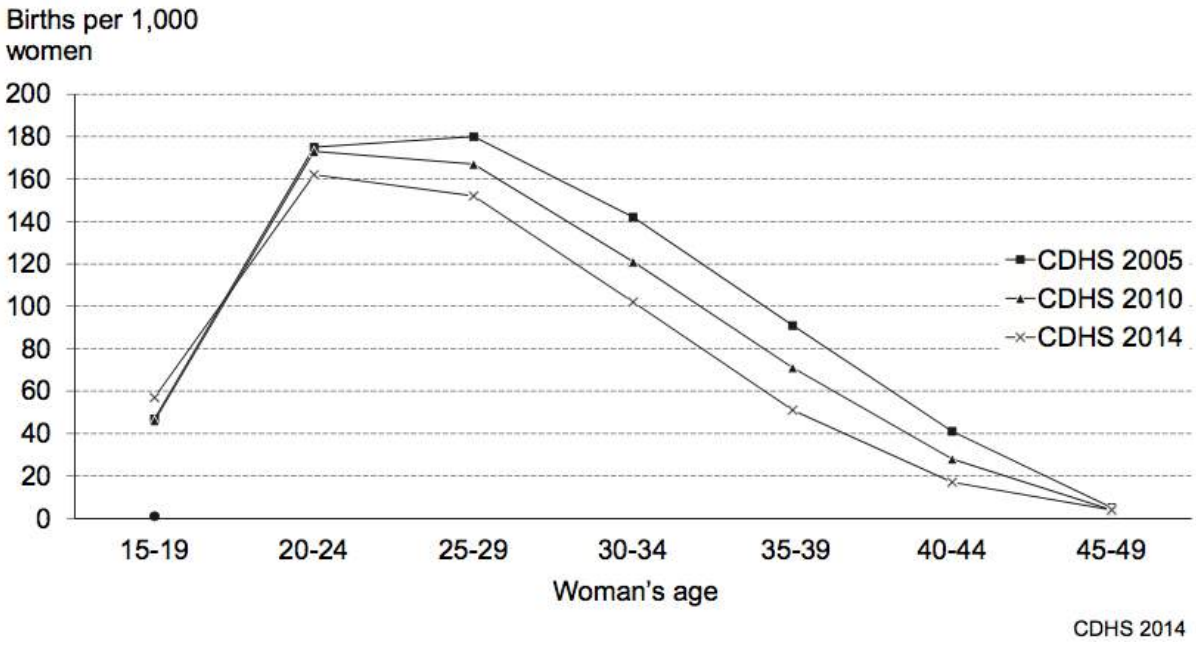
Table 7 -ASEAN countries; Working age population; absolute values; 1950 -2060

	Singapore	Thailand	Myanmar	Vietnam	Indonesia	Brunei	Cambodia	Laos	Malaysia	Philippines	ASEAN
1950	585	11,257	10,704	18,063	42,561	29	2,395	966	3,305	9,717	99,582
1960	897	14,770	11,709	19,520	51,944	43	2,980	1,174	4,167	12,985	120,189
1970	1,202	19,395	14,241	22,891	63,349	68	3,746	1,481	5,666	18,085	150,124
1980	1,647	27,045	18,301	29,361	83,461	112	3,778	1,699	7,946	25,188	198,538
1990	2,200	37,259	23,418	38,242	110,202	157	5,086	2,209	10,796	34,334	263,903
2000	2,791	43,654	28,970	49,079	137,966	218	6,893	2,873	14,715	45,079	332,238
2005	3,068	46,417	31,053	55,554	150,282	247	8,058	3,287	16,572	50,877	365,415
2010	3,742	48,786	33,206	61,842	161,699	282	9,090	3,821	18,432	56,819	397,719
2015	3,783	49,935	35,428	65,930	173,599	302	10,083	4,389	20,191	64,315	427,955
2020	3,669	50,071	36,773	68,438	184,564	320	10,892	4,872	21,799	71,721	453,119
2025	3,421	49,211	37,799	70,570	192,514	335	11,641	5,296	23,044	78,505	472,336
2030	3,176	47,794	38,519	71,714	197,661	345	12,308	5,669	24,117	85,162	486,465
2035	2,898	45,855	38,792	71,924	199,921	353	12,884	6,004	25,203	91,690	495,524
2040	2,705	43,870	38,484	70,955	199,899	355	13,339	6,272	26,191	97,971	500,041
2045	2,529	41,918	37,950	69,193	198,032	352	13,775	6,440	27,031	103,607	500,827
2050	2,356	39,966	37,063	66,263	194,648	351	13,500	6,493	27,623	108,480	496,743
2055	2,201	38,084	35,827	62,866	190,939	345	13,275	6,408	28,010	112,377	490,332
2060	1,981	36,171	34,632	59,515	186,766	339	12,876	6,212	28,207	115,439	482,138
1950-2010	3,157	37,529	22,502	43,779	119,138	253	6,695	2,855	15,127	47,102	298,137
2010 -2060	-1,761	-12,615	1,426	-2,327	25,067	57	3,786	2,391	9,775	58,620	84,419
Max - 2010	41	1,285	5,586	10,082	38,222	73	4,685	2,672	9,775	58,620	103,108
2060-Max	-1,802	-13,900	-4,160	-12,409	-13,155	-16	-899	-281	9,775	58,620	-18,689

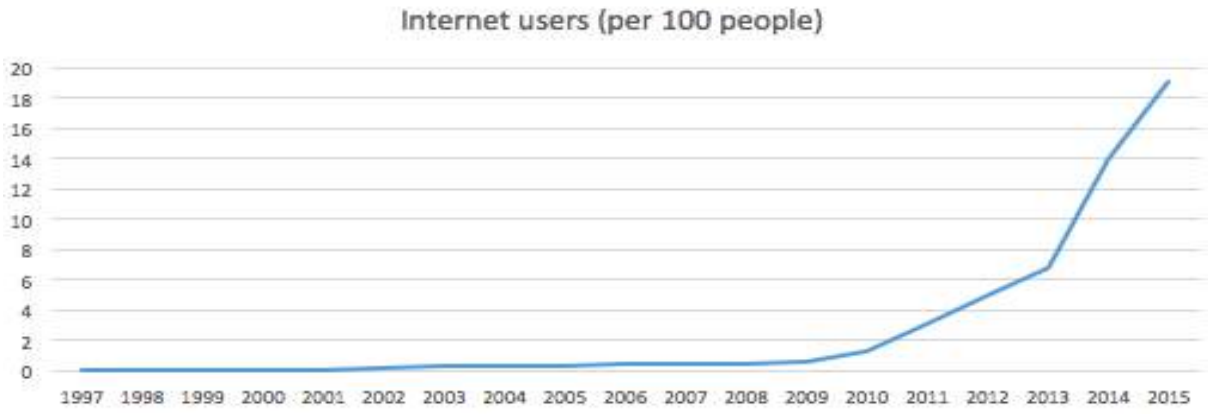
Appendix 3: Cambodia's age pyramid over time - ageing of the population and lower fertility rates (Retrieved from: populationpyramid.net, 25/10/2016, https://populationpyramid.net/cambodia/2035/)



Appendix 4: General birth rate decrease over time (2005-2010-2014)(National Institute of Statistics, September 2015, p.72)



Appendix 5: Number of Internet users per 100 people in Cambodia (The World Bank, 2016)



C. China's New One-child Generation: Analysis of impact and consequences of the one-child policy with a focus on preferences and social economic behaviour patterns

by Isabell Rosenögger, Simon Schäppi

The Chinese one-child policy was in place for 35 years and has heavily affected the Chinese society as well as its economic development. China is now facing various demographic challenges as a consequence of its family planning system. The aim of this paper is to investigate the impact and consequences of the one-child policy, next to the newly implemented two-child policy. A particular focus lies on the preferences and social economic behaviour patterns of the one-child generation. The basis for the information collection built several academic papers and selected press publications. Outcomes of the analysis concern selected fields of interest. With regard to fertility and society the imbalance of the sex ratio and the resulting problem of "missing women" are identified to be rooted in the one-child policy. Furthermore, the aspect of disparities in age and between generations is elaborated upon. Several challenges regarding health care, and a clear future deviation from established family models and values are determined. The increasing gap between young and old encompasses conflict potential and poses questions of care and responsibility. Further, influences of the policy on education and behaviour traits are examined. Only children are subjects to increased expectations, they are on average well-educated but less socially empathic and seen as tied to their parents. These aspects also relate to entering the labour market and contributing to the economy. Chinese employers openly discriminate against the one-child generation based on their perceived characteristics. Additionally, phenomena like urbanisation and migration preferences foster the unequal distribution of young educated workers. As a reaction to these emerging challenges, the government implemented a variation, the two-child policy, by the end of 2015. Consequently, a resulting increase in the fertility rate is expected in the future, however this might not outweigh the previous years' damage. Problems regarding the age and generation gap are not easily solved by having more children, as for example the current health care system already works at its capacity limit. Regarding the economy, second-children are expected to provide stimulation, while a change in policy also endangers jobs, which previously handled one-child policy implementation. Concerning population health, a positive effect of the two-child policy is expected as the sex ratio improves and its negative consequences (e.g. mental illnesses)

diminish. But how the exact impact of the change in policy will be and what effects it has on the problems caused by the one-child regulation will show in time. It can be concluded that the Chinese government's challenge about its population regulation mechanisms is ongoing and changing over time, thus adaptation and potentially fundamental rethinking of the established system are required.

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1. INTRODUCTION

China nowadays belongs to the most important industrial countries worldwide with a recent GDP of 10.866 billion US$ in 2015. Simultaneously, the population and life expectancy are steadily growing since the 1960s to 1.371 Billion people (2016) with an average expected lifetime of almost 76 years (World Bank, 2016). When it comes to the latter, namely China's population, several happenings in time significantly influenced the demographic and thus also economic development of the country. Back in the 1960s the fertility rate was about 6 children per woman of child-bearing age (Figure 1), partially explainable due to the ancient Chinese culture facilitating family planning. The interdependence between the population as a perceived indicator for economic growth, power and progress fostered early marriages and encouraged increasing family size, and was therefore deeply rooted in the Chinese society. In contrast to it, in the 1970s fertility declined due to the "late, long, few" policy (Hesketh, Lu, & Xing, 2005) for the first time since the 1500s. More specifically "a national birth control program under the slogan of later (marriage), longer (birth intervals), fewer (births)" (Feng, 2011) had been implemented.

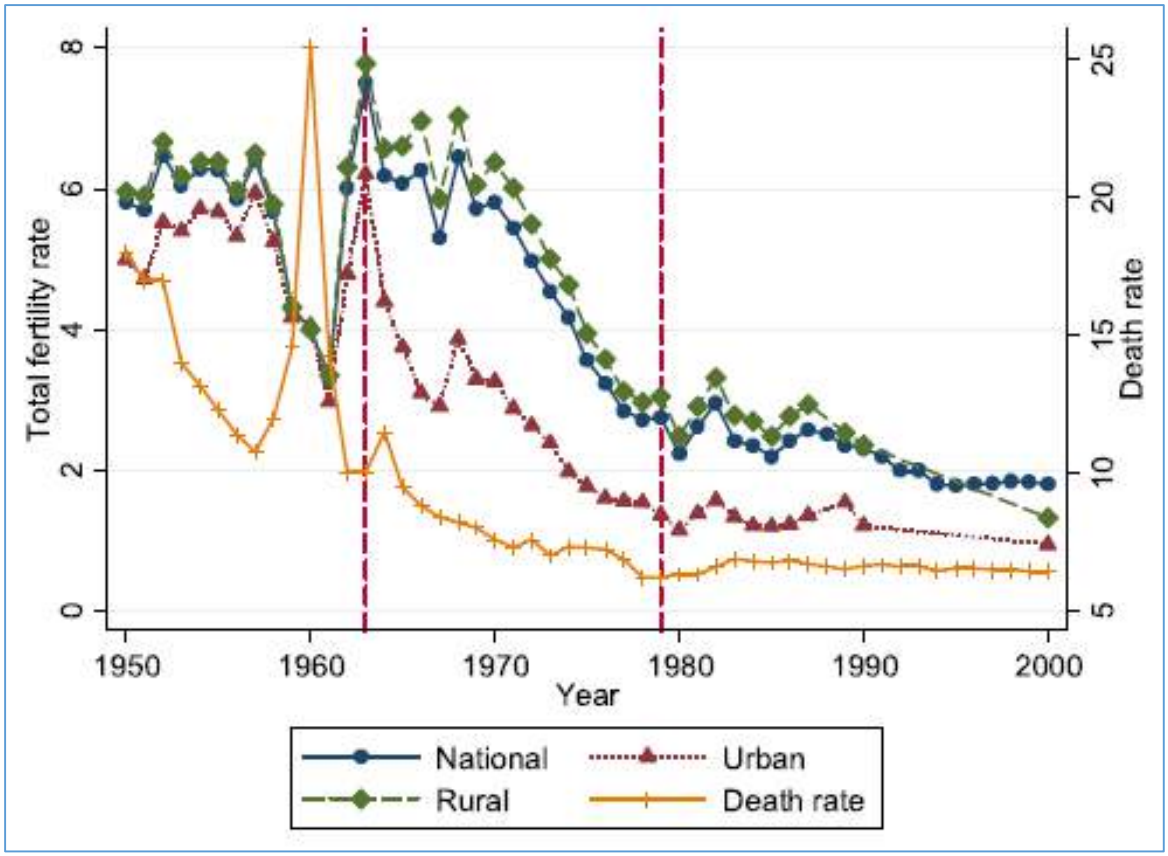


Figure 1, Total Fertility Rate: China Nationwide, Urban and Rural 1950-2000 (Wang, Zhao & Zhao, 2016)

In the following years, as China's orientation became more and more western, a new idea of birth control and the optimal population size had manifested. Thus, the implementation of the one-child policy followed in the 1980s accompanied by intense propaganda efforts. Its basic idea states that a family was allowed to only have one child - even though exceptions were made - for the benefit of the whole nation. Consequently the fertility rate declined again to 1.6 in 2010 (Wang, Yang, Zhang, & Chang, 2016). Three years earlier, in 2007, representatives of the Chinese People's Political Consultative Conference (CPPCC) undertook an attempt on the government to shut down the policy, based on concerns regarding social problems and personality disorders among young people, which did not come through (AsiaNews, 2007). In 2015, China finally decided to reverse the one-child policy and replace it with the two-child policy, effective from January 2016.

The purpose of the following paper is to discuss the effects and consequences of the one-child policy on the Chinese society with a focus on the preferences and social behaviour patterns of the one-child generation. To achieve this objective an analysis of secondary research is conducted.

The paper starts with an overview of the one-child policy and its implementation. The main focus is then set on the various consequences of this policy concerning the fertility and the well-being of the society, the age of the population and the generation gap, the education and behavioural patterns as well as the effects on labour respectively the economy in general. Further, an elaboration on the newly implemented two-child policy and its perspectives will be touched upon. In conclusion, the paper will give an insight on challenges China might face in the future.

2. The One-Child Policy

This paragraph aims to create a general overview on how China implemented the one-child policy, the involved parties, and its effects and consequences.

2.1 Policy Implementation

The fundamental aim of the one-child policy was to limit the nascent Chinese population through incentives and penalties meant to affect family size (Doherty, Norton, & Veney, 2011). The root cause of this policy is often seen in the Great Famine in China (1958-1961), during which depending on the source 15 to 45 million people died of starvation (see also Figure 1 above). The change from farming to steel production during this period led to a

severe lack of food. The fast growing population in the years thereafter brought up the fear of another famine, which the government wanted to prevent. Among other reasons there was also the strongly believed theory that population growth hindered development and the achievement of wealth (Wang, Yang, Zhang, & Chang, 2016). As a consequence, a target population of 1.2 billion by the year 2000 had been set by the government, when the policy had been introduced (Hesketh et al., 2005). Due to government officials, China's one-child policy prevented over 400 million births since its implementation in 1979. How this pursuit was applied will be discussed in the following.

In general, the government differentiated between planned and unplanned births, the former were subsidized, while the latter were disciplined through substantial fines - often exceeding the average income (Li, 1994). Thus, the economic advantage of having more children had been regulated through the increased penalties and vice versa. The financial benefits a family received for following the policy were seen as a compensation package for the sacrifice of having less children. In particular incentives like health subsidies, better housing, extra food, access to education and career possibilities, as well as cash subsidies were granted to the families following the one-child policy. On the other hand, sanctions for non-compliance went beyond simple monetary fines: Couples were prevented from officially registering non-granted children, which generally degrades their chances for fulfilling basic needs (Short & Fengying, 1998). In short, unregistered children and their families had to suffer disadvantages from their day of birth.

Overall, the one-child policy has neither been static over time nor fix in place. The government frequently adjusted its regulations and in several regions the policy's implementation was more or less strict (e.g. urban vs. rural). Thereby, the fact, that this policy has never been made a national law, did not hinder its enforcement by the provinces (Thomas & Price, 1996). Several governmental units were devoted to control and manage the family planning of their districts collectively. More specifically, birth allowance, couple registration, prenatal care, sanctioning and many more duties (Doherty et al., 2011) fell into the responsibility of these departments.

Even though the one-child policy had been decided on national level, exceptions were not uncommon. Firstly, the restriction of only having one child exclusively applied to Han-Chinese, thus minorities and other ethnic groups were not concerned. Secondly, further exceptions were made for families, whose first child was a girl, if the first child was disabled, if parents were "only children" or in case of special occupations (Short & Fengying, 1998).

Moreover, as touched upon above, the regulations in rural locations were less strictly implemented compared to the more densely populated areas. Exemplarily for about 70% of the families living in rural areas, a second child was allowed after a five-year period (Hesketh et al., 2005).

3. CONSEQUENCES

The consequences of the one-child policy are numerous and concern different aspects of the Chinese society. In the following, the most important ones are analysed.

3.1 Fertility & Society

There is strong evidence that the one-child policy affects the sex ratio in China, which is defined as the proportion of males against females (Ebenstein, 2010). This ratio peaked in 2005 with 121 males for every 100 females born in China and some regions in rural areas displayed even a value of 140 (Zeng & Hesketh, 2016). The sex ratio is found to be positively correlated with the rigour the one-child policy was enforced in a particular region: The more consequent the enforcement, the higher the quota of men against women (Wang, Zhao, & Zhao, 2016). However, after the steady increase in the sex ratio, the latest estimates from 2014 show a lower ratio of 114 for the overall Chinese population (Zeng & Hesketh, 2016).

China is well-known for its preference for sons, as they are said to be economically more valuable, especially in rural areas, and in the long-term perspective more likely to care for their parents, as daughters are expected to move out after marrying. Furthermore, the Chinese government's exception - to be able to have another child if the first one is female - undermines the perceived lower value of daughters (Eklund, 2011). This observation is visualized in Figure 2, which presents the since 1975 "rising sex ratio among second births following a daughter in China". Moreover, sex-selective abortions account for a large decline

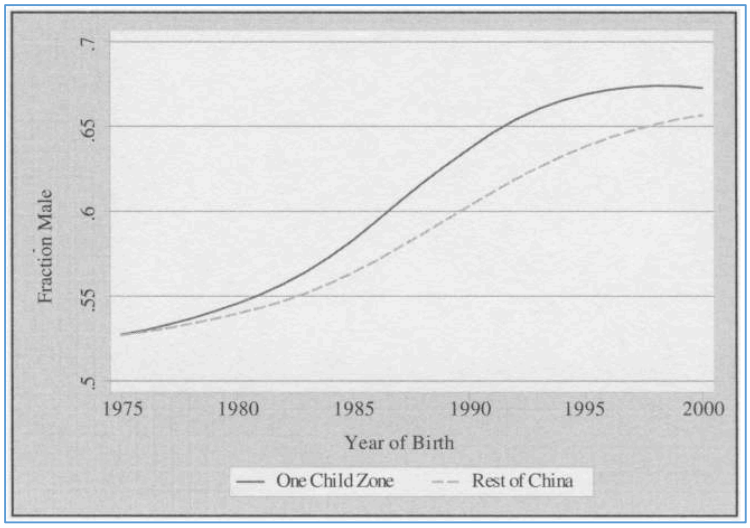


Figure 2, Rising sex ratio among second births following a daughter in China (Ebenstein, 2010)

in the proportion of female births (Coale & Banister, 1994; Lofstedt, Shusheng, & Johansson, 2004). Whether these findings are only caused by the one-child policy or whether the invention of the diagnostic ultrasound for sex determination was the main trigger is open for speculation (Zeng & Hesketh, 2016).

However, estimates from 2011 imply that more than 40 million women were “missing” in China. Through the “constructed” sex imbalance, mental health problems and socially disruptive behaviour among men increased (Tuljapukar, Li, & Feldman, 1995). Problematic is especially that marrying and having children is almost seen as a duty in the Chinese culture and a solitary life is not widely accepted. Studies found that never married men have a higher level of depression, are more aggressive and are more likely to commit crimes leading to a destabilisation of the society (Zhou, Zheng, & Hesketh, 2013; Zeng & Hesketh, 2016).

Viewing the sex ratio problem from another perspective, one can identify several implications regarding the artificial scarcity of women in China due to the one-child policy. Nowadays, females receive a privileged standing in the Chinese society, as men risk to end up in a marginalized situation characterized by being unmarried and without children, which does not apply to women. Furthermore, Chinese women are on average superior in education than their male counterparts and therefore able to achieve better outcomes (Abrahamson, 2016). To some degree the one-child policy has led to more equality for girls, since parents having a girl were forced to invest their resources into her education and health instead of neglecting her on behalf of the boys in the family (Zeng & Hesketh, 2016). Low fertility has remarkably increased the share of women studying to 52% in undergraduate and 48% in postgraduate studies, allowing them to hold a well-paid occupation later on (Zeng & Hesketh, 2016). Despite this rather positive effect from a female perspective, one exception has been identified by To (2013) as the “sheng nü”, which translates as “leftover women”. The latter are identified to be single, female professionals, who - when it comes to marriage - collide in their values and believes with the traditional male view and thus are unable to find a partner.

3.2 Age & Generation Gap

Another aspect, which is tied to the imbalanced sex ratio and the decreasing fertility in China concerns the age and generation gap accompanied by the steady increase in the average life expectancy. As the proportion of elderly people (over the age of 65) is expected to rise to more than 15 % by 2025 (World Bank, 2005), China might face severe problems concerning pension provision in the future. As “pension coverage is only available to those employed in

the government sector and large companies" (Hesketh et al., 2005) and thus limited, the senior citizens' dependency on the younger generation will intensify. Traditionally, sons (and sons-in-law) support their parents with financial means, while daughters (and daughters-in-law) were responsible to take care of the older generation. The lack of the second is negatively affecting the quality of care that older people receive (Zeng & Hesketh, 2016). This fact emphasises once again the importance of children as social coverage for their relatives at age in China, and the related conflict evoked by the one-child policy. Moreover, the fact that only children will be responsible for two generations (four grandparents and two parents) - is identified as the "4:2:1 effect" (Hesketh et al., 2005).

In the Chinese traditional culture, happiness of the own family was highly prioritised, meaning that the one-child policy is also undermining these deep rooted values as the following example shows. The first generation after policy implementation has "only" no siblings, the second generation, however, is missing siblings as well as aunts, uncles and cousins, and the third generation is not having any relatives at all. The previously important sense of caring for the own family will therefore be completely lost within three generations. Even with a change in the policy this so-called "loneliest generation" will remain lonely even in their old age with effects on their personality and behaviour, which are currently difficult to estimate (Wang, Yang, Zhang, & Chang, 2016).

An additional concern regarding the generation gap implies the different understanding and values between the generations, which might even lead to conflict. Young Chinese citizens have the tendency to move to the urban areas due to economic reasons, which often collides with their "perceived duty" to care for their relatives (Abrahamson, 2016). Additionally, increased accessibility and labour migration foster social dislocation, and intensify the conflict of leaving family members "behind" (Cook & Dong, 2011). A tragic result of these changes (combined with other reasons) is the four to five times higher suicide rate among elderly Chinese (65 years and older) compared to the general population (Wang, Yang, Zhang, & Chang, 2016).

Even though the previous imbalances regarding fertility and age have been identified, when observing the big picture, Feng (2011) argues that the "relatively young population age structure (…) produces more births than deaths", thus China's population will not be halved in the next three decades.

3.3. Education & Behaviour

Going beyond the consequences relating to fertility and age, it is a logical consequence that children's well-being and family life have been fundamentally shaped by the one-child policy (Short, Zhai, & Yang, 2001). Only children are often referred to as little emperors, since they are said to be spoilt, selfish and unsociable although empirically, there is only mixed evidence for these character traits (Zeng & Hesketh, 2016).

Yang (2007) states that in the context of one-child families it can be observed that parents' expectations towards their children rose, resulting from the "you sheng you yu" propaganda campaigns. This made the one-child generation even more valuable for their parents, who – especially the ones in a strict policy rule regime area - prioritized their offsprings' education (Yang, 2007). Simultaneously, the pressure on the one-child generation to deliver the expected performance, while being the major focus of their parents' attention, grew. This development also has a positive effect based on the so-called quantity-quality model. This theory states that less children (quantity) increases the children's quality since there are more resources for their support available. In the case of China, studies confirm this development based on the 50% increase in years of schooling within the last 30 years (Wang, Zhao, & Zhao, 2016).

A further consequence of the one-child policy was found by Stevenson & Lee (1996) who elaborated on the fact that Chinese children in general "are taught to focus less on their natural abilities and more on the exertion of effort and their obligation to bring glory to their families". Thus it can be concluded that the values of success, diligence and stamina are deeply rooted in the Chinese society.

In dependence on education matters, the following paragraph elaborates on the behavioural characteristics of only children. Several properties have been specified by Cameron, Erkal, Gangadharan and Meng (2013) who compare and measure behavioural differences between the pre- and post policy generation. They elaborated on the concept of sibling deprivation, defined as self-centered, less cooperative and symphonizing behaviour, on the basis of previous research by Blake (1981). Throughout their findings they differentiate between cognitive and non-cognitive properties. Regrading the former, significant evidence for only children being less trusting has been found. Further, a substantial difference in risk-awareness between pre- and post one-child policy subjects could be identified. Even though the values were not significant, a strong tendency towards only children being more risk-averse has been diagnosed (Cameron et al., 2013).

With respect to the non-cognitive findings, the category “personality and outlook on life“ has been investigated via a post-experiment suvery including the “Big Five Inventory“, which incorporates measures of openness, conscientiousness, extraversion, agreeableness and neuroticism. Results show that only children are overall less optimistic, less conscientious and show higher scores for neuroticism. Possible explanations are, on the one hand, that the presence of “positive sibling relationships moderates the relationship between stressful life events and internalizing behaviours“. On the other hand, single children are proven to possess a higher drive for achievement and competitive attitude, which refers back to their parents’ expectations, discussed previously. However, generally speaking, these differences in personality traits are more extrem among young children and tend to diminish as they grow older. The reason is that the influence of parents weakens with the age of the children and other sources of inspiration such as the school and the society in general become more powerful leading to more commonalities among children (Zhong, 2005).

What implications these findings have on different components of the Chinese labour market and economy will be discussed in the following section.

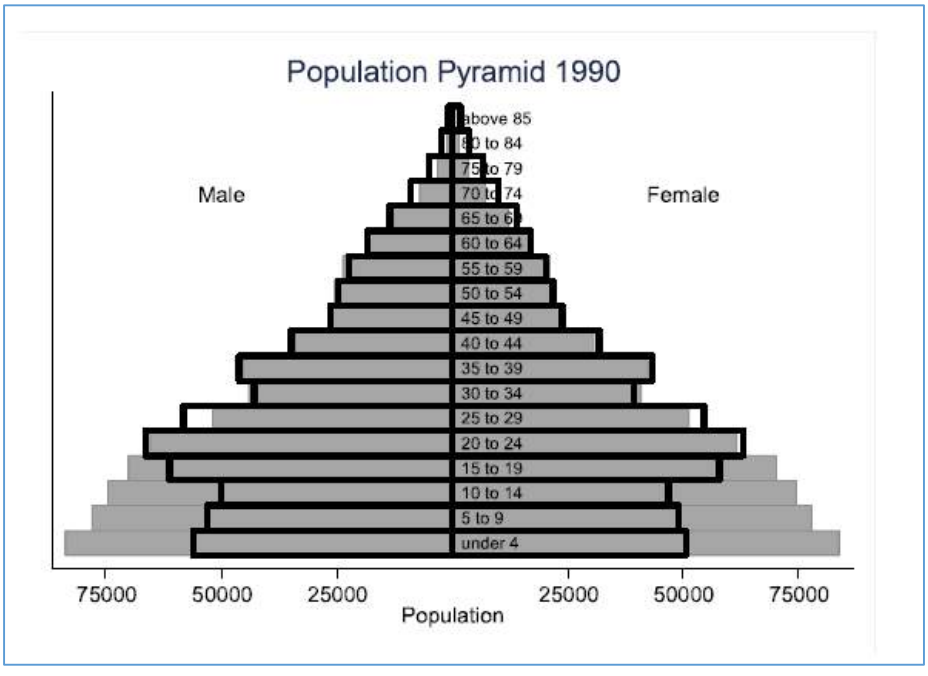
3.4. Labour & Economy

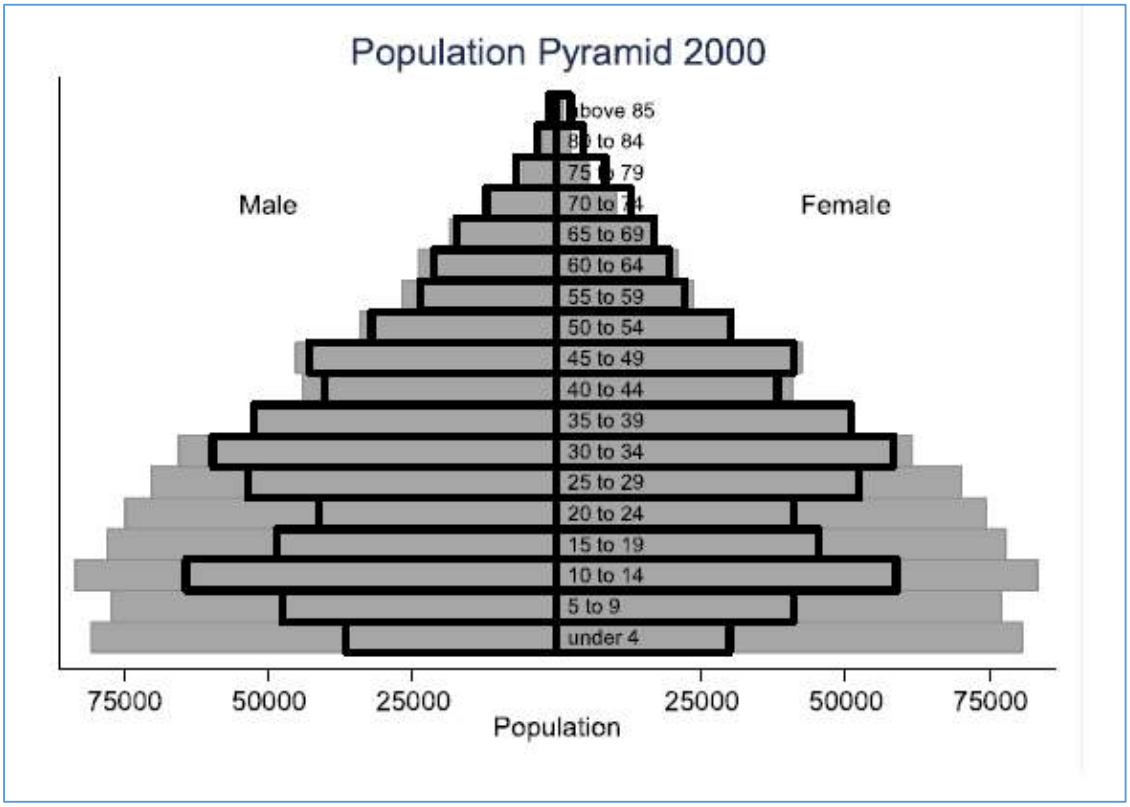
As pro-social behaviour in general states an advantageous asset, the one-child generation is expected to suffer from deprived preconditions with regard to institutional development. The peculiarity of only children’s non-cognitive attributes might significantly impact their prospects regarding educational attainment, health, marriage and divorce, as well as in the labour market. Additionally, the lack of risk-taking hinders the thriving process of entrepreneurial activity, where sound growth potential was observed very recently in China (Cameron et al., 2013; Tse, 2016).

Further, employment discrimination represents another challenge only children have to face in the labour market. It is common practice for Chinese employers to instruct their recruitment personnel to investigate applicants’ family background. Some companies openly admit their preference towards non-only children based on several conceptions. Applicants from urban areas and only children are perceived as tied to their parents and not to be resilient. Furthermore, they are said to be “effemiate and overconfident“, next to their tendecy to “hop from job to job“ (Quiang, 2006). Thus, it can be concluded that the one-child generation is, despite of its oustanding academic qualifications and the demand for a young workforce, not wanted by Chinese employees.

Urbanisation, the internal migration of habitants from rural areas towards urban areas, poses a further problem to the Chinese demography and is the main reason for the differences in the average age of the population on the countryside compared to the cities. Wang, Zhao and Zhao (2016) found a negative correlation between birth rate and in-migration, meaning that less births in a city lead to more migration towards this city. The reasoning behind this finding is that a lower supply of local labour in these cities (due to a more restrictive policy) leads to an increased demand for migrant workers. Migrants are generally speaking young people who try to find a better job in the cities, thereby they reduce the average age of the population in their destination area and increase it likewise in their place of origin. As an example, in Beijing and Shanghai the percentage of people older than 65 years decreased during the period 2000 till 2010. In general, this trend leads to the rural areas having more severe demographic problems compared to the cities (Wang, Zhao, & Zhao, 2016).

The Chinese economy boomed over the last decade, said to be a golden era even, and nowadays stands for impressive growth rates and successful business undertakings. This process of transitioning from a developing to an industrial first-world nation is largely attributable to a young and productive labour force, which has built a large part of the population in the past. At the same time, the retirement and pre-working proportion constituted a relatively small fraction (Singh, 2012). Thus, optimal conditions for economic and social development were given in the past. Now, as the demographics change, due to the low fertility, the gender imbalance and age gap, the “era of abundant young and inexpensive labour” is expected to end soon (Feng, 2011). In fact, since 2010 the working-age population in China is declining, which already led to labour shortages and as a consequence increasing wages (Wang, Zhao, & Zhao, 2016). For the illustration of this change, Figure 3 shows the real development of the Chinese population from 1990 to 2010 in black squares, whereby the grey areas represent the projected development without any family planning policies.





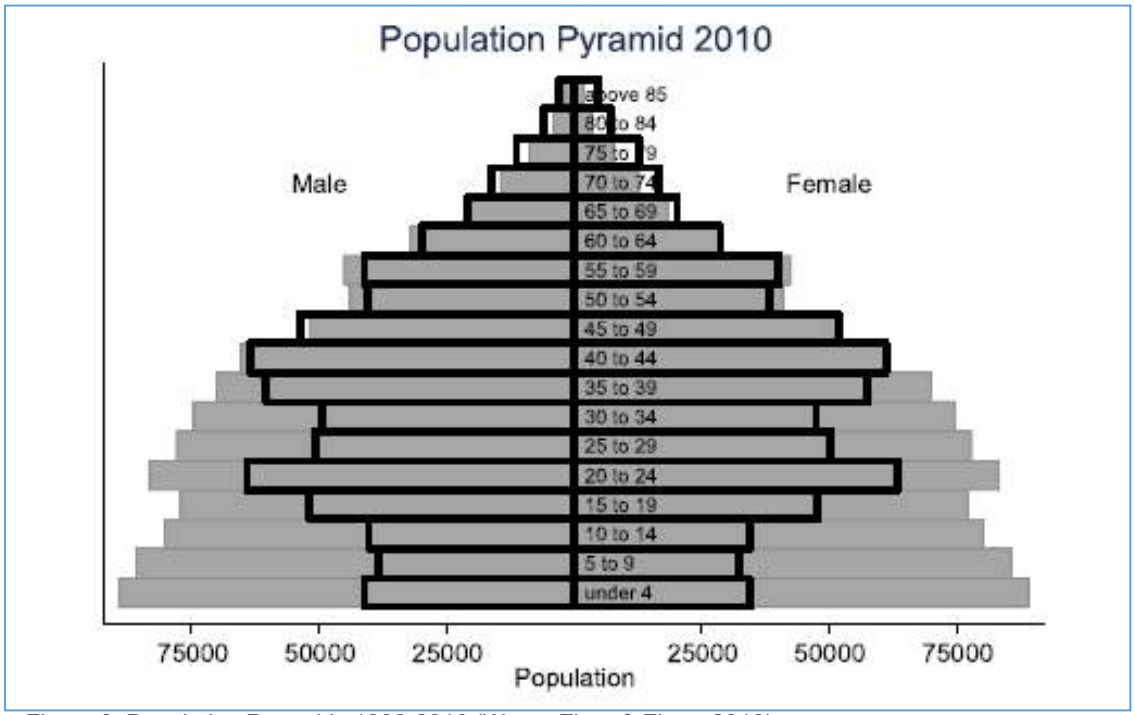


Figure 3, Population Pyramids 1990-2010 (Wang, Zhao & Zhao, 2016)

Several measures exist describing a nation's demographic impact on its economy. One of them states the demographic dividend, which is defined as "the demographic contribution to

the growth rate of the economy" (Feng, 2011) or as a measure for "gains and losses per capita income brought about by changes in a population's age structure" (Singh, 2012). Apart from labour supply, this also incorporates the aspect of capital in-and outflows in the Chinese economy, as stable currency and savings state a precondition for positive prospects regarding investments and growth. China was benefitting from its demographic dividend since 1964, however, since 2013 this has come to an end and its demography is now negatively affecting the economic growth (Singh, 2012). Further, the retirement age in China, which is currently set at 60 years for men and between 50 and 55 for women, drastically impacts the savings amounts, while also the increased lifespans exhaust the population's monetary reserves and lead back to the generation gap. If nothing changes, calculations yield to the fact that by 2035 "every two taxpayers would have to pay the social security expenses of one retired person" (Singh, 2012).

4. Recent Developments

After 20 years of a relatively strict one-child policy (see 2.1 Policy Implementation), the Chinese government began to stepwise allow for two children. The reason for this changing focus can be found in all of the previously mentioned topics. How this new policy was implemented and what its effects are is elaborated in the following.

4.1 Implementing the Two-Child Policy

Starting from the year 2000, the Chinese government allowed couples of which both parents were only children to have two infants. In November 2013, this policy was further relaxed and now allowed couples to apply for a second child, if already one of the two partners was born and raised as an only child themselves (Wang, Yang, Zhang, & Chang, 2016). In theory, around 11 million couples in China qualified for this new relaxed policy (Xinhua, 2014), however, one and a half years after implementation only 1.76 million couples applied for a second child. This leads to an estimated birth increase of only 1 million per year instead of the projected 2 million (Pei, 2015). Obviously, this attempt to increase the birth rate did not go far enough to combat the threats associated with the overageing population, hence a new policy was needed (Wang, Zhao, & Zhao, 2016).

After almost three decades of withstanding heavy criticism from Western countries as well as from Chinese demographers, in October 2015, the government announced the end of the one-child policy by the end of 2015 (Abrahamson, 2016). However, instead of leaving family

planning completely up to the couples, they implemented a so-called universal two-child policy, allowing all couples in China two have from now on two children. Having three children is nevertheless still prohibited and will be strictly punished with social compensation fees as it was the case before (Sha, Jie, & Wenxi, 2016). President Xi Jinping (2015) announced the end with the following reasoning:

> "This can enable us to achieve balanced development of the population in China. It is an important move toward demographic balance in terms of the long-term development of China. After serious examination of its likely effects, the Ministry of Health and the Family Planning Committee argue that this policy is feasible." (Wang, Yang, Zhang, & Chang, 2016)

The effects of this new policy and, whether this policy change will indeed achieve Jinping's objective of a demographic balance, is discussed in the following chapter.

4.2 Effects of the Two-Child Policy

The newly implemented policy will among others affect the fertility, the ageing of the population, the economic development, the sex ratio and the population health. In the following, a prediction concerning all of these issues based on a study by Zeng & Hesketh (2016) will be provided.

4.2.1 *Effect on Fertility*

There is no doubt, that the two-child policy will increase the fertility rate in China which lies currently around 1.6 (see 1. Introduction), however, the impact might not be as strong as anticipated by the government. The reason for not having more than one child is not anymore the policy but the socioeconomic situation in China. According to multiple surveys on this subject, 90 percent of all Chinese women wish to have one or two children but not more. In urban areas, around 65 percent prefer to only have one child, whereas this statistic is estimated to be significantly lower in rural areas. The reason was found to be the high costs of raising a child (especially concerning its education), the expected change in lifestyle as well as the negative effect on the own career. Taking these reasons into account, till 2030 a rise of the overall fertility rate up to 1.8 is expected (Zeng & Hesketh, 2016). Wang, Zhao and Zhao (2016) reviewed several studies conducted on possible fertility changes before the two-child policy was implemented and came to a similar conclusion. However, in the first years after implementation, a higher impact is foreseen that will level off in the years after.

4.2.2 *Effect on the Sex Ratio*

Allowing families whose first child was a girl to have another child (named 1.5 child policy – see 2.1 Policy Implementation), is seen as the major reason for the high sex ratio. With the universal two-child policy this ratio will be reduced, since also couples having a boy are now allowed to have another child, which is potentially a girl. However, the preference for sons is deeply rooted in the Chinese society and is therefore - without a ban on all sex-selective technologies - unlikely to disappear in the short-run (Zeng & Hesketh, 2016).

4.2.3 *Effect on Population Ageing*

The ageing of the population and the related problems will be less significant due to the two-child policy. The two most exposed groups being the empty-nesters (parents, whose children left their home) and disabled elderly will be less numerous, nevertheless these groups will still pose a tough challenge for the currently insufficient health care system (Zeng & Hesketh, 2016).

4.2.4 *Effect on economic Development and Labour*

The two-child policy will lead to a higher and later peak population of around 1.45 billion people in 2029 and a gradual decline thereafter (Zeng & Hesketh, 2016). Figure 4 shows the projected development of the Chinese population in four different scenarios: With a continuing one child policy and three possible levels of increased lifetime birth rates per mother (Wang, Zhao, & Zhao, 2016). Until 2030 the two-child policy will not have an effect on the labour market, after that the workforce will be increased by around 40 million until 2040 respectively 60 million until 2050. This change will be crucial to sustain economic growth and has therefore a positive effect on China's GDP. Further, there is the side effect that these second children stimulate the economy and create additional jobs with their increased demand for goods and services (Zeng & Hesketh, 2016).

A challenge that the government of China respectively its provinces will face is the reduction of income from the extremely high social compensation fees collected for illegal children. In addition, there are 5 million people working in the family planning departments, most of which will have to be laid-off or reallocated to other functions (Zeng & Hesketh, 2016).

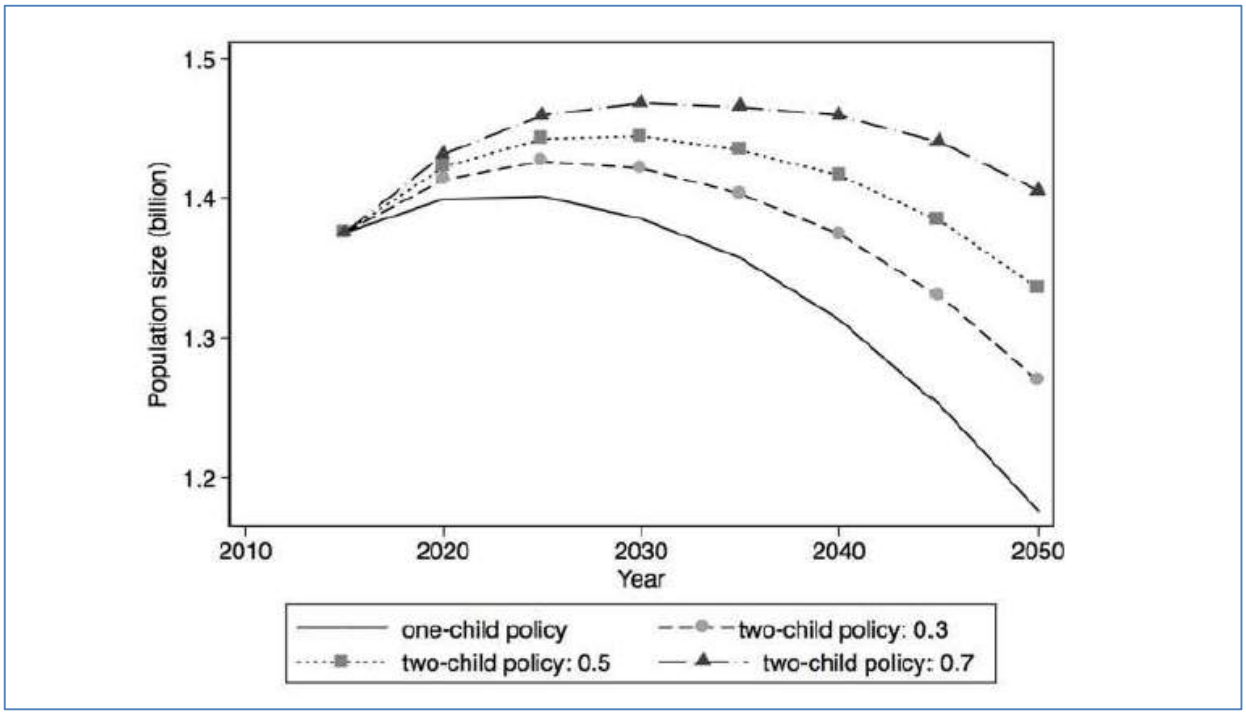


Figure 4, Simulated Population Size under the One-and Two-Child Policy (Wang, Zhao & Zhao, 2016)

4.2.5 *Effect on Population Health*

For every age group, the two-child policy will have positive consequences: Newly born children will more likely be officially registered and consequently less end up in orphanages, women are less likely to carry out risky abortions, men will more likely get married preventing mental problems and elderly will have more family members to take care of them (Zeng & Hesketh, 2016).

The policy change will, however, have a negative impact on the already weak health care system. Already under the one-child policy there was a prevalent scarcity of paediatricians and obstetricians, which will further increase with more births. This lack of sufficient health care is further an often mentioned additional reason for couples not to have multiple children (Zeng & Hesketh, 2016).

5. CONCLUSION

The one-child policy has not only led to a low fertility rate but also caused a high sex ratio and a lack of women as a consequence. It has led to an overageing population, a lack of care for the elderly and resulting tensions within families. The personality traits of only children are significantly different than those of children with siblings, which might cause

problems in the future or lead to a change in the Chinese culture. Only children are discriminated on the labour market, and the economy faces a shrinking labour force as well as declining growth rates partly as a result of the policy.

The newly implemented two-child policy has primarily a positive effect on all the demographic issues analysed. Nevertheless, it is still limiting people's freedom to decide on the amount of children they want to have, which is seen as a violation of basic human rights. Even though this relaxation will help to reduce the negative effects of the one-child policy in the long-run, it will not manage to reverse them completely. The one-child policy was in place for too long, and the two-child policy changes too little to overcome the prevalent demographic problems. There will be huge challenges for the government to overcome in all the mentioned areas. In the near future, there will be no way for the Chinese government around the topic of completely abolishing the centralised family planning policies.

6. Self Criticism / Limitations

The paper at hand is subject to some concerns, which have to be taken into consideration while using its findings.

The study is due to location and accessibility constraints based on secondary data obtained from various online sources. Not all of the sources cited in the text are, however, academic papers. Partially, it was relied on newspaper articles and other less formal literature due to the lack of research especially regarding the work-related discrimination of only children. In addition, the aim of uncovering the preferences of the one-child generation turned out to be very challenging based on scientific data. They were primarily of implicit nature consequently the same accounts for this paper. A more explicit tackling of these issues might involve primary data collection. Further, the two-child policy was implemented less than one year ago meaning that up to today, only very few studies were published on this subject, as a consequence, a comparison with other studies was not always possible. Moreover, it has to be noted, that most sources are from Chinese academics, hence it is questionable whether parts of the data presented underlay censorship or were artificially improved. Further, since this paper is to a large degree trying to foresee the future, it relies on estimates and sometimes contradicting views about the policies' consequences.

7. Outlook on Further Research

The implementation of the two-child policy is the basis for an unlimited amount of new studies analysing its consequences and conducting before-after comparisons. The only children from the banned one-child policy and their development continue to be an insightful study subject, there is especially a lack of research concerning their integration in the job market. Further research areas of interest are the impact that the demographic changes in China are having on the world economy or the consequences of a weakened demand for national products in China due to the decline of the young population which pose the most active consumers. A third suggestion is to conduct an analysis of the effects of the decrease in labour force entrants since they are the ones equipped with the most recent education and knowledge.

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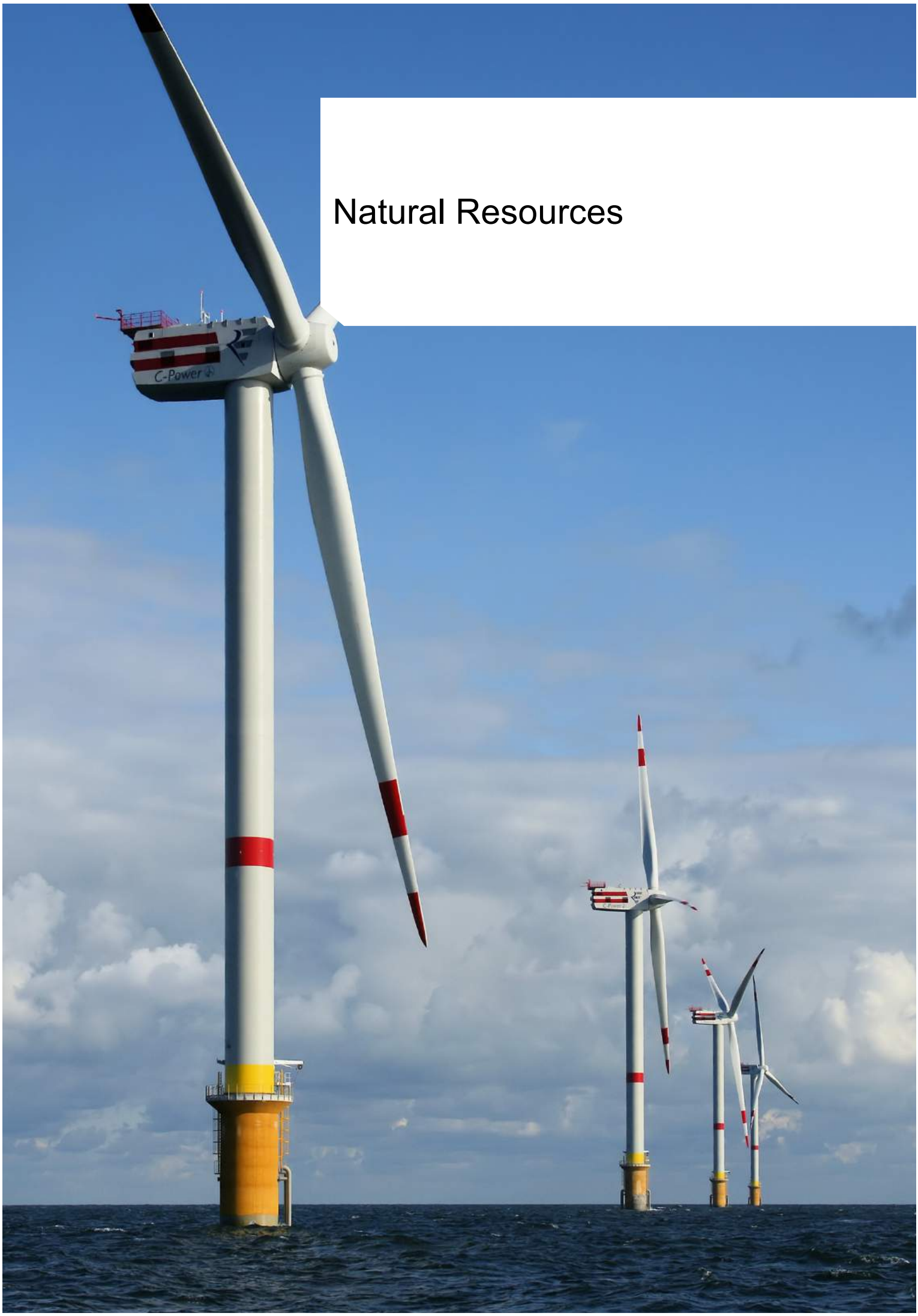
Natural Resources



D. How will Demography Influence Demand for Energy in Terms of Quantities and Qualities?

by Patrick Bitterli, Angela Honegger, Geraldine Leuthardt

The present paper examines the quantitative and qualitative influences of demography on energy consumption and how future challenges might be addressed. It thereby focuses on future demographic trends in Switzerland, which are identified to be a migration-triggered population growth, a highly urbanized society and an upwards-shifting age structure.

Based on future scenarios for Switzerland in 2030, various demographic levers impacting the future quantitative and qualitative energy demand are identified. After analyzing their individual effect, it can be concluded that the overall demographic change will induce an increasing overall energy demand in Switzerland, while also leading to changes in its current energy mix. These developments will lead to major challenges, such as the ongoing negative environmental impacts, the security of energy supply and the dependency on foreign energy imports.

Based on a PESTL-analysis, possible mitigating levers are indicated to overcome these future challenges. Supported by a combination of economic and social incentives with the latest technologies, the political sphere must provide an overarching framework to change the future energy consumption in Switzerland, whose impact should be ensured through legal actions.

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1. INTRODUCTION

If everyone on the planet consumed as much as the average Swiss citizen, three earths would be needed to sustain them (von Stokar et all., 2006). This fact impressively illustrates how Switzerland currently lives beyond its means. An overwhelming share of 67% of Switzerland's ecological footprint is thereby accounted to energy consumption, making energy a key driver for carbon dioxide emissions. As this current energy consumption consists to 50% of oil products, Switzerland is moreover strongly dependent on oil suppliers and thus other countries. Aggravating this situation, it has been argued by various researchers that many countries may have reached 'peak oil status', wherefore oil extractions have already reached their maximums (e.g. Ganser, 2014, p.20). Inevitably, oil deposits will thus sooner or later come to an end, letting oil prices explode and most likely leading to an oil crisis. Energy consumption has thus become a very central issue, raising the question of what the future energy consumption is going to look like and how society can tackle the challenges associated with it.

One of the main factors driving energy consumption is the ongoing demographic change (York, 2007). Besides the apparent increasing energy demand of fast-growing societies, other demographic trends such as age structure and urbanization influence energy consumption as well and pose different challenges and opportunities to future generations. Switzerland as an economically highly developed country with a rather fast growing population compared to other European countries and the prediction of a fast ageing population also faces distinct future energy challenges, which have to be tackled today. This paper thus focuses on demographic changes and their influence on energy consumption, both on a global viewpoint and on Switzerland by answering the question '*How will demography influence demand for energy in terms of quantities and qualities?*'

The first chapter gives an overview of demographic trends, both from a global viewpoint and with a focus on Switzerland, and shows their influence on energy consumption. Based on the findings in this chapter, three possible scenarios for Switzerland's demographic structure in 2030 are drawn. Taking the most likely scenario as a reference point, it is further analyzed what impact this future demographic development has on Switzerland's energy consumption. It is predicted that demographic change has an influence on Switzerland's energy consumption in quantitative as well as in qualitative terms, whereby the changes may have contrary effects to some extent. However, it can be assumed that these developments involve considerable challenges and risks for the Swiss energy policy. The last chapter thus

introduces possible actions to mitigate negative influences on energy consumption and the environment due to the future demographic shift in Switzerland.

2. Influence of Demographic Change

To answer the above-mentioned question, the first sub-chapter focuses on trends of demographic change, while the second focuses on their influence and their implication on energy consumption. After a global overview is given, the focus is thereby drawn to Switzerland.

2.1 Demographic Trends

Demographic change can be categorized into three major trends, which will heavily shape the world's future. These trends encompass 'population size', 'age structure', and 'urbanization' and are explained in the following section.

Population Size

World population nearly exploded from 2.5 billion in 1950 to 6 billion in 2000. In only 50 years, world population was tripled, which corresponds to an average annual growth rate of 1,76%. (UN, 2004, p. 4) This growth was mostly explained by improved sanitations and public health measures coming along with economic development. However, Rittenberg and Tregarthen concluded that the positive effect of economic development on population growth holds only for the first steps towards economic improvement, as economically more developed regions were found to have shrinking growth rates: With higher incomes, opportunity costs of raising a child increase as well, slowing down fertility rates. (2009, p. 795-801)

Today's population growth trends confirm this theory, as the average growth rate of 1.2% is projected to steadily slow down to 0.33% in 2050, correlating with a continuous economic development. Still, this development will result in an increase of 57 million people every year until 2050, letting world population increase up to 9 billion people. (UN, 2004, p. 4-7)

Most growth will thereby stem from low- and middle-income regions, accounting for 99% of world population growth. In high-income areas, however, population growth rates will slow down dramatically: Due to falling fertility rates in high-income regions, growth rates are predicted to fall short of replacement-levels by 2050. (World Bank, 2016a; UN, 2004, p. 5)

Age structure

The uneven distribution of the world population's growth rate shed light to another demographic trend: Regions with a slow or even negative growth rate such as Europe will face the challenge of an ageing population. Additionally, mortality rates tend to amplify this development, as areas with high fertility rates usually have also higher mortality rates. This

increases the effect of an ageing population in high-income regions and leaves low- and middle-income regions with a much younger population. An example can be found in Africa (Middle East and North), which simultaneously has the world's highest growth rate of 1,8% (2015) and the world's lowest life expectancy, mostly due to HIV / AIDS (World Bank, 2016c).

In a long-term perspective, life expectancy is predicted to go up, while fertility rate is slowing down in every region. At some point in the future, world population size will thus level off (see Figure 3 in the appendix, p. vii). These different age structures bring new challenges to the respective world regions: High-income regions will face challenges regarding pension models and work replacement issues, while low- and middle-income regions will have the opportunity of a large working-age population associated with economic development, but face the challenges of a very fast growing population. (UN, 2004, p. 4-9, p. 66-81)

Urbanization

Next to changes in size and age structure, a further trend concerns the world population's preferred living environment. Today, more than half (54%) of the world's population live in urban areas, with the share increases to 66% in 2050. Furthermore, today's 28 so called mega-cities hosting more than 10 million inhabitants are projected to increase to 41 in 2030. This trend can be explained by the wide-spread desire of a better living, which is often associated with the economic growth and stability, developed infrastructure systems and higher life expectancies of modern cities. However, fast growing cities also bring along challenges and costs regarding a sustainable development, as infrastructure and policies are often stretched to their limits with such high numbers of new inhabitants. (UN, 2014)

Focus Switzerland

To determine the impact of the global demographic trends outlined above on Switzerland, it is crucial to specify their concrete manifestation in the Swiss population, as the degree of these trends may vary significantly across countries.

As a high-income country, Switzerland is influenced by the trends associated with slow growth rates, high life expectancies and urbanization. Correspondingly, in 2014, Switzerland's life expectancy amounted to 83 years, its annual population growth was at 1,2% and 18% of its population was over 65 years old (Word Bank, 2016a; World Bank, 2016b). Switzerland's growth rate is thereby mostly due to migration, since fertility rates are steadily decreasing and fell below migration rate in the 1980s. (BFS, 2016)

Besides characteristics in age structure and growth trends, with 84,5% of Switzerland's inhabitants living in urban regions, it counts as one of the most urbanized countries on earth.

But even though Switzerland is very urbanized and space is becoming more precious in cities, only 2.25 people live on average within a Swiss household (compared to India, where 4.8 people live on average per household (ArcGis, 2015)). (BFS, 2016)

2.2 Influence on Energy Consumption

The trends explained above correlate with different energy-related challenges and opportunities. In the following section, the influences of the outlined demographic trends on energy consumption are analyzed. Again, the section starts with a global overview, before focusing on the influence on Switzerland's energy consumption in the next chapter.

Relationship between Population Size and Energy Consumption

An initial research stream assumed that population growth and energy consumption correlate linearly. If the population grows by 1%, energy consumption should also increase by 1%. In the 1970s, the 'IPAT' equation was used to measure this linear relationship between population size and environmental change and was later applied to analyze energy consumption:

$$I = P \times A \times T$$

I= Environmental Impact, P= Population, A= Affluation (consumption per person), T= Technology (impact per unit of consumption)

Though the IPAT equation was widely used in the 70s, there are many researches who disagree on the linearity of the relationship between population growth and energy consumption. York for example found a highly elastic relationship, explained by a destabilization of population triggered by population growth, which leads to an inefficient planning of energy consumption. (2007) Researchers such as York (2007), Dietz and Rosa (1997) and O'Neil et al. (2012) explained this inconsistency in research by stating that the equation ignores important factors such as the demographic trends mentioned above. Their research states that although energy consumption indeed is positively correlated with the growth of a population, energy consumption is also influenced by urbanization and the age and economic structure of a society. These variables attenuate or strengthen the influence on energy consumption.

Relationship between Age Structure and Energy Consumption

Age structure is one of the most important trends that has a significant influence on energy consumption in quantitative and qualitative terms. Liddle and Lung (2010) experienced a U-shaped curve where young people under 34 years and elderly people above 65 years need

more energy than middle-aged people. On one hand, this is explained through household sizes: Young and elderly people tend to live in smaller households of one or two persons, as the first often have not started a family yet, while in the case of the latter, children have already moved out of the family home. Thus, these age groups generally need more energy per person compared to middle-aged people, who often share a household with more family members. By sharing accommodation, household appliances and facilities but also lighting and heating are shared as well, resulting in a lower energy consumption per person. (Liddle & Lung, 2010)

On the other hand, younger and elderly people's consumption patterns lead to different energy demands from a qualitative perspective, as analysed by Kronenberg (2009): He concludes that the energy mix and intensity of a region changes significantly depending on its age structure. While younger people tend to use more energy for refined petroleum products - especially more fossil fuels to stay mobile and run cars -, elderly people's energy consumption is increased through the need of heating and electricity for household devices, as they live a more domestic-centered lifestyle. An ageing population would thus increase the demand for heating and electricity and reduce energy demand for mobility, leading to a shift in the underlying energy sources used. (Kronenberg, 2009)

Relationship between Urbanization and Energy Consumption

Liddle and Lung 2010, p. 334-335) have stated that one of the effects of urbanization with regard to energy consumption is that travelling and private transportation decreases, while public transportation increases, leading to less energy consumption. Others argue that urbanization measures access to a countrie's power grid, and increases the consumption of energy intensive commodities, spurs economic development and labor productivity, which in turn leads to an increase in energy demand. (O'Neil et al., 2012)

However, Huang et al. (2007) describe a more refined relationship between different economic development statuses and energy consumption, which might explain the inconsistent research findings: In low-income countries, no relationship between economic development and energy consumption was found, while the relation was highly positive in middle-, and negative in high-income countries. The negative relationship within high-income countries can be explained in two ways: Firstly, it is likely that the economic development correlates with a transition of economic activity from the industry to the service sector while secondly, given the technological advancement, economic growth can be offset through more energy-efficient technologies. The GDP in middle-income regions, however, largely

consists of energy-intensive industrial production, wherefore economic growth sharply increases energy consumption. In the same vein, economic growth in low income-countries with a relatively small industrial sector showed no influence on energy demand. (Huang et all., 2007).

However, a more direct impact of economic development and labor productivity is an increase in employees' incomes which, in turn, usually leads to an increase in the consumption of energy intensive commodities (O'Neil et al., 2012).

It is thus not possible to derive a conclusive relationship between urbanization and energy demand, as different characteristics of urbanization must be taken into consideration with each impacting energy consumption in its own way.

3. Demographic Effect on Swiss Energy Consumption

To determine the demographic impact on energy demand in 2030 in Switzerland, an estimation of the underlying demographic scenario is needed. As future estimations inherently carry a strong uncertainty factor, this chapter provides an overview of three possible scenarios and their assumptions, before the next section analyses the impact of the most likely demographic scenario on energy demand.

3.1 Possible Future Scenarios

The following three scenarios are different combinations of underlying hypotheses, whereby the 'best' and 'worst' case scenarios combine the highest and the lowest hypotheses respectively (all estimations are based on figures published by the BFS (Bundesamt für Statistik, 2015, p. 1-20)).

Population Size:	9.5 Billion (+0.7% growth since 2015)
Old Age Dependency:	39,6 (+36% since 2015)
Employment:	83,9%; 53% of working force with tertiary education

Reference Case

In the reference case, population growth is at a moderate level: Economic migration is slowed down due to an improvement of the economic situation and a declining working

population in European countries. However, family-political actions such as cribs enhance the reconciliation of work and family life, wherefore fertility rates increase. However, this effect is weakened by work-related considerations, such as an increasing average age of mothers.

From a health perspective, mortality rates are further declining due to medical improvements and the prevention of harmful behaviour patterns. Furthermore, life expectancy increases due to an enhanced educational level, which is statistically related to a longer lifespan. As these developments burden the pension systems, early retirements become less common.

Population Size:	9.9 Billion (+0.9% growth since 2015)
Old Age Dependency:	37.7 (+29% since 2015)
Employment:	84,9%; 57% of working force with tertiary education

'Best' Case

In the 'best' case scenario, economic development in Switzerland is superior to those in other European countries, resulting in a large demand for skilled foreign workers. On the other hand, political measures are taken to encourage tertiary education and a better integration of women in the workforce. Thus, the ratio of working women increases strongly, resulting in a higher average age of mothers as well as an overall decrease of children per woman.

As in the reference case, medical improvements and the prevention of harmful behavior decrease mortality rates, especially for elderly people. Similarly, life expectancy increases as well due to an enhanced educational level. As in the reference case, these developments exacerbate the pressure on the pension systems, wherefore early retirements become less common and more people work beyond the statutory retirement age.

Population Size (2013):	9.1 Billion (+0.4% growth since 2015)
Old Age Dependency:	42 (+44% since 2015)
Employment:	83,0%; 48% of working force with tertiary education

'Worst' Case

In the ‘worst’ case scenario, Switzerland is in a fierce economic competition with other European countries, wherefore the economic growth of Switzerland is slowing down. Thus, economic migration and the political will to encourage higher education are toned down. In the same vein, low demand of the Swiss labor market leads to little changes in family policies, wherefore the birth rate stagnates at its current level.

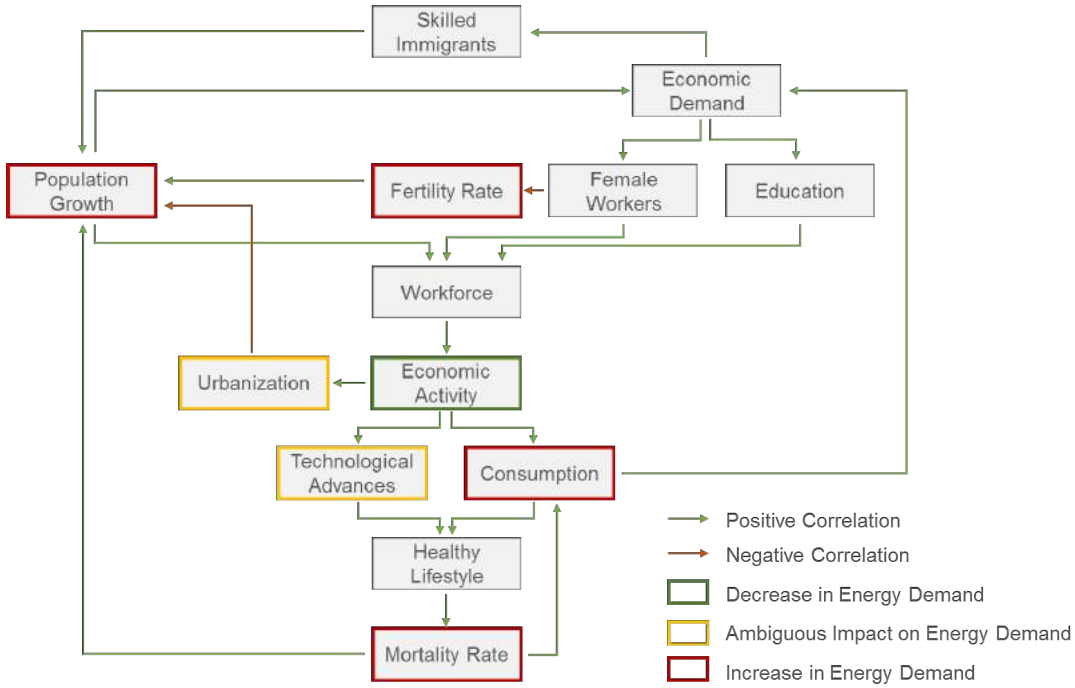
Mortality rates are reduced due to medical advancements, but the effect is hampered due to more wide-spread unhealthy behaviour patterns, partly due to the less favourable economic situation and lower educational levels. However, overall life expectancy increases (to a lesser extent than in the other scenarios), putting pressure on the pension system. However, as labor demand is virtually inexistent for elderly workers, early retirements increase.

3.2 Impact of Demographic Changes on Energy Demand

The scenarios outlined above depict different paths with a distinct impact on energy demand in Switzerland 2030. Due to the limited scope of this paper, this section focuses on the ‘Reference Case’ as an intermediate scenario, which is estimated to be the most likely prediction.

As outlined in Figure 1, an increase in economic demand will attract more skilled immigrants, while on the same time increasing the employment level of female workers and the overall level of education. Counteracting this circle, the increased share of female workers leads to a declining fertility rate and therefore an impediment of population growth. However, population growth, female workers and an increased educational level cumulate in an enlarged workforce, and thus spurring the economic activity of the country, which has multiple effects; Firstly, it will increase technological advances, while on the same time fueling consumption due to employees’ wages. Both levers increase the health of the population, thereby decreasing its mortality rate. The increased longevity contributes to population growth, while people consume over a longer period. Secondly, economic activity also encourages urbanization, which statistically leads to smaller family sizes (Bundesamt für Statistik, 2016a, p.5).

Figure *1*: Demographic Ecosystem and its Impact on Quantitative Energy Demand



Source: Own contribution

Quantitative Energy Demand

Within this interlinked ecosystem, different levers can be identified that influence quantitative energy consumption of Switzerland in 2030. Firstly, a growing population increases energy demand as more people require energy. As an indirect effect of this development, the consumption of energy-consuming products increases as well. Furthermore, the ageing society – depicted through the fertility and mortality rate – raises energy demand as well: As the old age dependency factor increases by roughly 30%, the share of elderly people increases, whose energy consumption is considerably higher than that of middle-aged people.

The only factor leading to a decrease in energy demand is the stimulated economic activity: As Switzerland is a high-income country, economic growth is usually connected with a shift from industry to service-oriented activities which are lower in energy demand.

However, there are also levers in the ecosystem for which the impact on energy demand could be positive or negative. Firstly, technological progress may on the one side lead to more energy-efficient technologies, while on the other side possibly increases the range of

energy-consuming devices. Secondly, urbanization may decrease energy consumption per person due to concentrated living and the use of public transportation, while on the same time increasing the possibilities of living a more energy-consuming lifestyle.

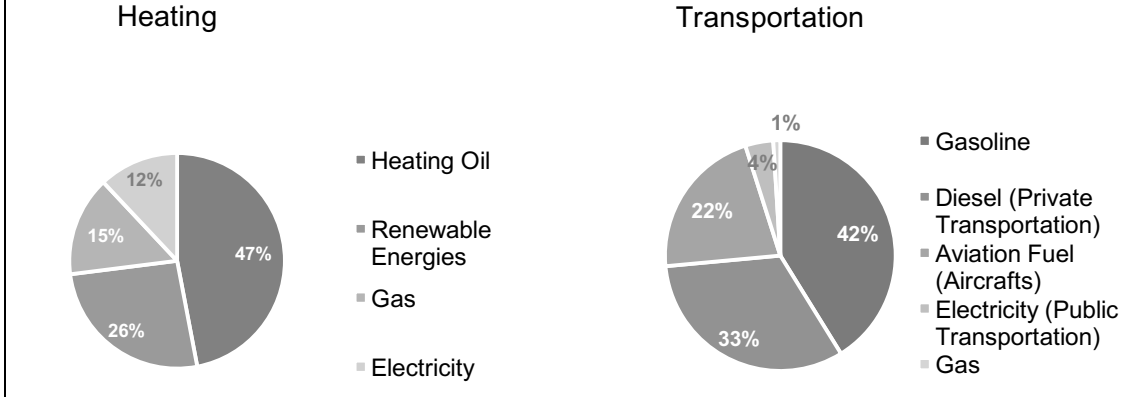
Thus, it can be concluded that demographic change is most likely to increase quantitative energy demand in Switzerland. However, there are some trends whose overall impact on energy consumption cannot be clearly estimated and which might thus counteract this effect. Yet, they are unlikely to outweigh the overall rise of energy demand in quantitative terms.

Qualitative Energy Demand

Demographic change will also have an impact on energy demand in qualitative terms. This is due to the fact that different population groups have distinct behaviour patterns. Depending on the relative growth of these groups the relative frequency of these patterns changes, influencing the frequency of the underlying energy sources (Kronenberg, 2009, p. 2637).

Starting with the changing demographic structure of Switzerland, i.e. the ageing of its society, it can be estimated that behaviour patterns typically associated with elderly people will increase. These patterns include a reduced mobility, whereby energy consumption linked to staying at home increases, e.g. through a more frequent and intensive heating, or a more frequent use of lighting or home devices (Kronenberg, 2009, 2642). As depicted in Figure 2, an increase in these activities is likely to favour electricity, as well as oil and renewable energies. However, a reduced mobility will at the same time have an opposite effect on oil, as most cars currently run on oil-based fuels.

Figure2: Current Energy Mix of Different Consumption Patterns



Source: EnDK, 2014, p. 7; Bundesamt für Statistik, 2013, p. 74

A second influencer on the energy mix is the ongoing urbanization. As people are more likely to live in cities with rather dense infrastructure networks, it is likely that they will change their mobility pattern and substitute gas-consuming car rides with electricity-driven public transportation systems. Thirdly, the absolute increase in energy demand due to a growing population may also trigger changes in the relative composition of the energy mix. On the one hand, an increasing demand may be incompatible with the targeted shift to renewable energies by 2050 and the accompanying nuclear phase-out, without affecting the security of supply. This may thus enable fossil or nuclear energy to maintain important energy sources. On the other hand, an increasing energy demand may – although on a more global level – enhance the profitability of currently unprofitable energy carriers, e.g. sand oil (McKenna, 2016).

However, as these qualitative changes in energy demand by 2030 are to some extent contradictory and as an estimation of their respective intensity would go beyond the scope of this paper, no conclusion regarding the overall effect of demographic change on the energy mix in Switzerland 2030 can be drawn that goes beyond the indication of the single effects.

3.3 Challenges and Risks for Swiss Energy Policy

Even though demographic change is only one factor out of many that influence future energy demand in Switzerland, its impact on Swiss energy policy can be estimated to a certain extent (all other developments held constant). The overall increase in energy demand quantity and the change in energy demand quality thus lead to or at least amplify different challenges and risks which are briefly outlined in the section below. These challenges in turn entail different actions to counteract their impact, as explained in the next chapter.

Influence on Climate

As outlined in Chapter 3.2, demographic change is estimated to substantially increase the overall energy demand in Switzerland in 2030. Ceteris paribus, this will spur energy production and therefore lead to an expansion of the existing energy production facilities. This development is especially sincere as fossil fuels constitute a significant amount of Switzerland's current energy production, with the example of crude oil constituting 52% of the Swiss energy mix (Ganser, 2014, p. 2). An increase in energy demand will therefore - all other things equal - lead to an elevated environmental pollution. This will put considerable additional pressure on the environmental system and thus fueling the ongoing climate change.

Security of Supply

Another major challenge of an increased energy demand is the continuous securing of supply. This becomes especially relevant given several constraining factors such as the planned nuclear phase-out or the slow but sure diminishment of oil reserves (Der Schweizerische Bundesrat, 2013, p. 7565). Meeting a larger energy demand with a more limited amount of energy sources thus requires either enhancing the efficiency with which energy is consumed or supporting alternative energy sources to make up a larger share of the energy mix. However, these options are linked to costly investments in alternative energy infrastructure, which – at the current low prices for energy – are often not economical yet (energiewende, 2016).

National Dependency

Interlinked with the challenge of securing supply come the risks that are associated with the energy-related dependency of Switzerland on other countries. As – with the exceptions of hydropower and firewood – Switzerland has rather little energy deposits, 77% of its energy stems from imported energy carriers (Bundesamt für Statistik, 2016b, p. 1). Thus, Switzerland is dependent on the maintenance of trade relations to energy supplying countries, which to a certain extent threatens the sovereignty of the state and makes Switzerland susceptible to coercive efforts through the interest driven policy of other states (Nachrichtendienst des Bundes NBD, 2010, p. 13).

4. POSSIBLE ACTIONS

Given the challenges and risks outlined in Chapter 3.3, demographic change may substantially influence energy demand and may thus be critical to the success of energy policies (Hamza & Gilroy, 2010, p.782). Therefore, this chapter introduces possible actions to mitigate negative influences on energy consumption and the environment due to the future demographic shift in Switzerland. The proposed measurements thereby tackle negative consequences due to an overall increase in energy demand as well as due to a shift in the energy mix. As a structure guideline, the PESTEL-Framework[14] is applied. However, as the environment is hereby the factor being influenced, rather than providing actionable levers itself, it is left out as a sphere. Nevertheless, the measurements of the remaining spheres

[14] PESTEL is a concept used to analyze the external environment from different points of view (PESTEL Homepage, List of References). It structures the environment into the following spheres: Political, Economic, Social, Technological, Legal and Environment.

prove to be highly interactive, wherefore the following section shows that no energy saving intervention within an isolated sphere is likely to be successful.

4.1 PESTL-Analysis

Political

On a political level, the Swiss government released the “Energiestrategie 2050” in 2011, which consists of the four pillars energy efficiency, promotion and increase of renewable energies, a nuclear phase-out and foreign energy policy. The first measures were focusing on leveraging energy efficiency through e.g. financial funds for building restoration and fostering renewable energy through feed-in tariffs and investment contribution for plants (BfE, 2016c). These political levers are mainly focusing on reframing the qualitative energy demand by changing consumption patterns on an incentivizing base. In the same vein, a further measurement would be to foster the public transport system: By stimulating the usage of public transports, the per capita energy consumption could be reduced, especially in urbanized regions. As political influence on public transportation is relatively high, a considerable transition of the energy mix towards more renewable energy sources could be possible. Such a model was recently presented by the government with the concept of ‘mobility pricing’, introducing a fair price system, depending on transportation time and mean (NZZ, 2016).

Economic

According to the previous chapter, the proportion of senior citizens over 65 will rise continuously in the next decades, leading to a rising domestic energy consumption. In this connection, the economic lever of steering royalties could play an important part, which aims to induce behavioral change and which is already used in Switzerland on fossil fuels since 2008 (BAFU, 2016). The funds raised with the royalties are used for economic incentives, such as investment compensation when building private photovoltaic systems. This mixture of steering royalties and financial incentives can thus stimulate the quantitative and qualitative energy demand: The quantitative demand can be reduced through raising royalties on fossil fuels, which is likely to lead to a higher awareness when heating the house. The same funds raised are used to incentivize citizens to change their energy mix to more renewable sources, e.g. through feed-in tariffs (called KEV) from the state (BfE, 2015).

Steering royalties and financial incentives have proven to induce a behavioral change in energy consumption. Therefore, this path should be pursued further or even be extended,

e.g. in combination with a promotion of public transportation mentioned in the section above. However, in order to assure a continuous change, even when the incentives are reduced, these measures need to be combined with social components, explained in the next section (Abrahamse, Steg, Vlek & Rothengatter, 2005, p. 281).

Social

An intervention on a social level aims at influencing behavioral determinants underlying moral obligations (Abrahamse, Steg, Vlek & Rothegatter, 2005, p.275). As Switzerland has one of the highest equivalence income adjusted to purchasing power in Europe (NZZ, 2014), such social measures are likely to be successful, as there are no economic restrictions that inhibit pro-environmental actions (Guagnano, Stern & Dietz, 1995, cit. in Steg, 2008, p.4450).

As the energy-saving potential of energy efficiency is estimated to be higher than less effective consumption, a social intervention should aim on establishing social norms on efficiency gains (Abrahamse et al., 2005, p. 274). This is even more relevant given the assumption that the social awareness of energy efficiency measures is a rather new phenomenon, and thus less present within elder generations.

As the demographic shift in Switzerland will lead to an increasing energy consumption within households, a possible action would be to raise awareness of households through setting concrete goals, e.g. to save 20% of energy. To achieve this, utility companies would have to provide smart devices to let consumers overview their savings (see next section). Through an awareness campaign, a moral obligation could be invoked to take part in a nation-wide energy saving movement. This social lever could therefore incentivize people to reduce their overall energy demand, e.g. by switching to more efficient household devices, as well as becoming more aware of their qualitative energy mix.

However, the ‘intention-behavior gap’ of social actions must be kept in mind, which is considered to be fairly large, as current studies show that only half of all intentions are translated into actions (Sheeran & Webb, 2016, p. 511). Thus, to increase the effect of social interventions through moral obligations, a combination with economic or legal incentives is needed, for example in the form of lower utility prices for households that achieve the saving target.

Technological

Undeniably, the flood of new electronic devices on the market may lead to a rising quantitative energy demand. Nevertheless, the technological headways are responsible for improvements that generate energy savings through higher efficiency. As the shift in the

demographic structure leads to an increase in behavior patterns typically associated with elderly people, an important driver to stimulate future energy demand is the accessibility to smart consumption devices. With ‘smart metering’, consumers are able to easily monitor their daily electricity, heating or gas consumption (Palmer, 2015). In Switzerland, the potential of smart metering was acknowledged in the ‘Energiestrategie 2050’, which foresees the development of a smart energy grid, enabling smart metering for the end users (BfE, 2016a). Smart grids are supported by communication and information technologies and support a regulation of energy production fluctuation (e.g. of private solar panels) and balance energy consumption (e.g. by turning on the washing machine in times of energy overcapacity) (BfE, 2016a). Thus, smart grids address both the quantitative and qualitative energy demands by illustrating individual saving potentials to each household.

Another technical lever is the enablement of new standards. As one third of CO_2-steering royalties are used to finance building programs, a potential measurement could be the setting of new standards, such as the trademark ‘Minergie’. It sets a standard for minimal energy consumption on buildings and offers a huge potential to overcome future energy shortages on a domestic level. Considering that 50% of energy usage stems from buildings, the potential of a quantitative energy reductions is enormous (Minergie Fachtagung, 2013).

Legal

As mentioned above, the energy saving potential is likely to not be exploited through behavior stimulating incentives alone. Rather, there is also a necessity for prohibitions of inefficient energy consumers, such as specific household devices. The efficiency of legal levers for energy consumption is shown by the success story of the prohibition of conventional light bulbs in Europe, which led to a reduction of 25% of energy consumed in domestic illumination in Germany. The effect is observable despite an increase in the number of households every year. (Wahnbaeck, 2016).

As the share of elderly people in Switzerland will grow and thus the overall domestic energy consumption is likely to rise, legal levers could focus on the energy efficiency of household devices. Switzerland already requires the labeling of such devices according to their energy efficiency, so that customers can compare the relevant numbers when buying new appliances (BfE, 2016b). To take further actions in order to bring down the overall energy consumption level, legal restrictions regarding the sale of devices within the least-efficient category could be an effective measurement.

5. SUMMARY

The present paper developed demographic-based levers which indicate how demography will influence quantitative and qualitative energy demand in the future. The future demography of Switzerland will thereby be shaped mainly by a migration-triggered population growth, a highly urbanized society and an upwards-shifting age structure due to rising longevity and decreasing fertility rates. The influences of these trends on Swiss energy consumption are however contradictory to some extent:

The quantitative demand is increased by a growing population and the associated increase in consumption. The ageing of society will further increase energy demand, as elderly people tend to use more energy than middle-aged people. On the other side, economic activity is likely to decrease energy consumption, while the impact of the technological progress and urbanization could influence demand for energy positively or negatively. Influences on the qualitative demand, i.e. the energy mix, are however even harder to predict. The ageing of the Swiss population will shift consumption from mobility- to domestic-focused energy. However, how this will affect the energy mix strongly depends on the composition of the energy sources underlying these different consumption patterns. In the same vein, it is unclear how urbanization and the absolute increase of energy consumption will influence the energy mix, as these developments depend on many different (non-demographic) variables.

However, it can be concluded that the overall demographic change will lead to an increasing overall energy demand in Switzerland in 2030. This development will lead to major future challenges for Switzerland, such as the ongoing negative environmental impact, the security of energy supply and the national dependency on foreign energy imports. Based on a PESTL-analysis, the present paper indicates possible actions to overcome these future challenges, whereby all analyzed spheres are highly interactive. The political sphere must thereby provide an overarching framework, which is combined with economic and social incentives, supported through the latest technologies. However, most of these stimulating levers are likely to have only limited impact unless they are combined with legal actions.

5.1 Limitations and Outlook on Further Research

Due to its limited scope, the present paper could only focus on the most likely and moderate scenario, which is characterized by a more optimistic approach about economic and social developments. Thus, rather unlikely, events with a however severe influence on demographic developments and impact on energy consumption could not be taken into

account. Thus, future research could on the one hand enrich the portfolio of scenarios by adding projections about such events, while on the other hand focus on the impact on energy demand of the remaining two scenarios. Also, further research regarding the precise influence of demographic trends on energy demand would be crucial for more accurate predicti

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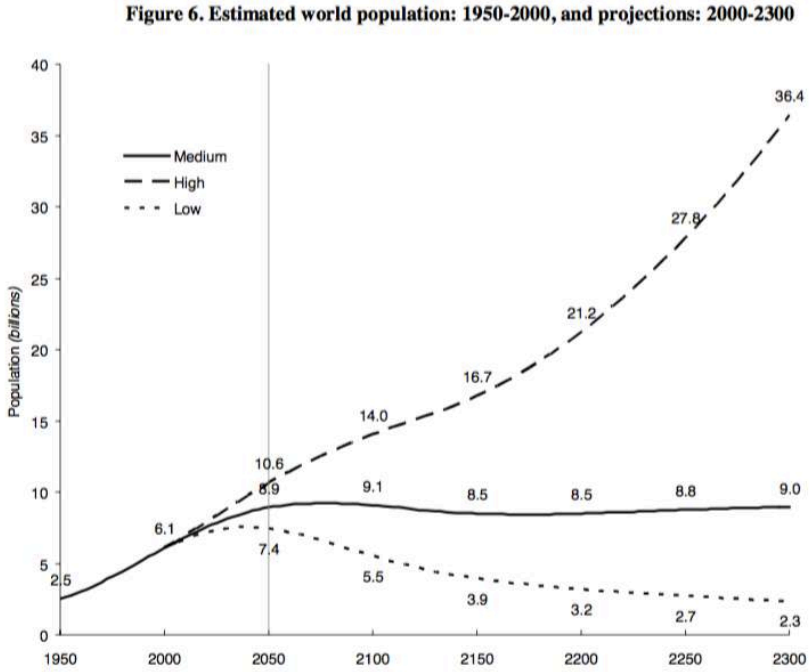
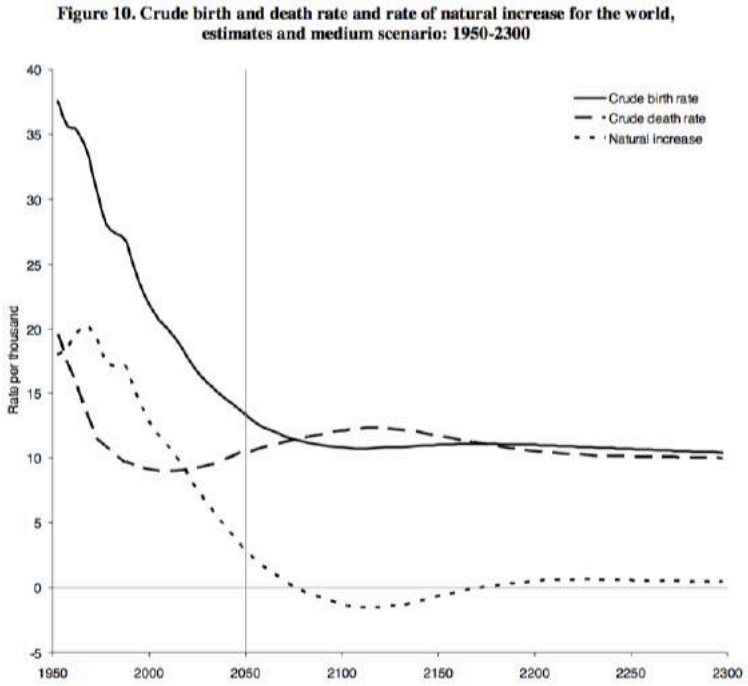
Figure *3*: Estimated world population – 1950-2000 and projections 2000-2300



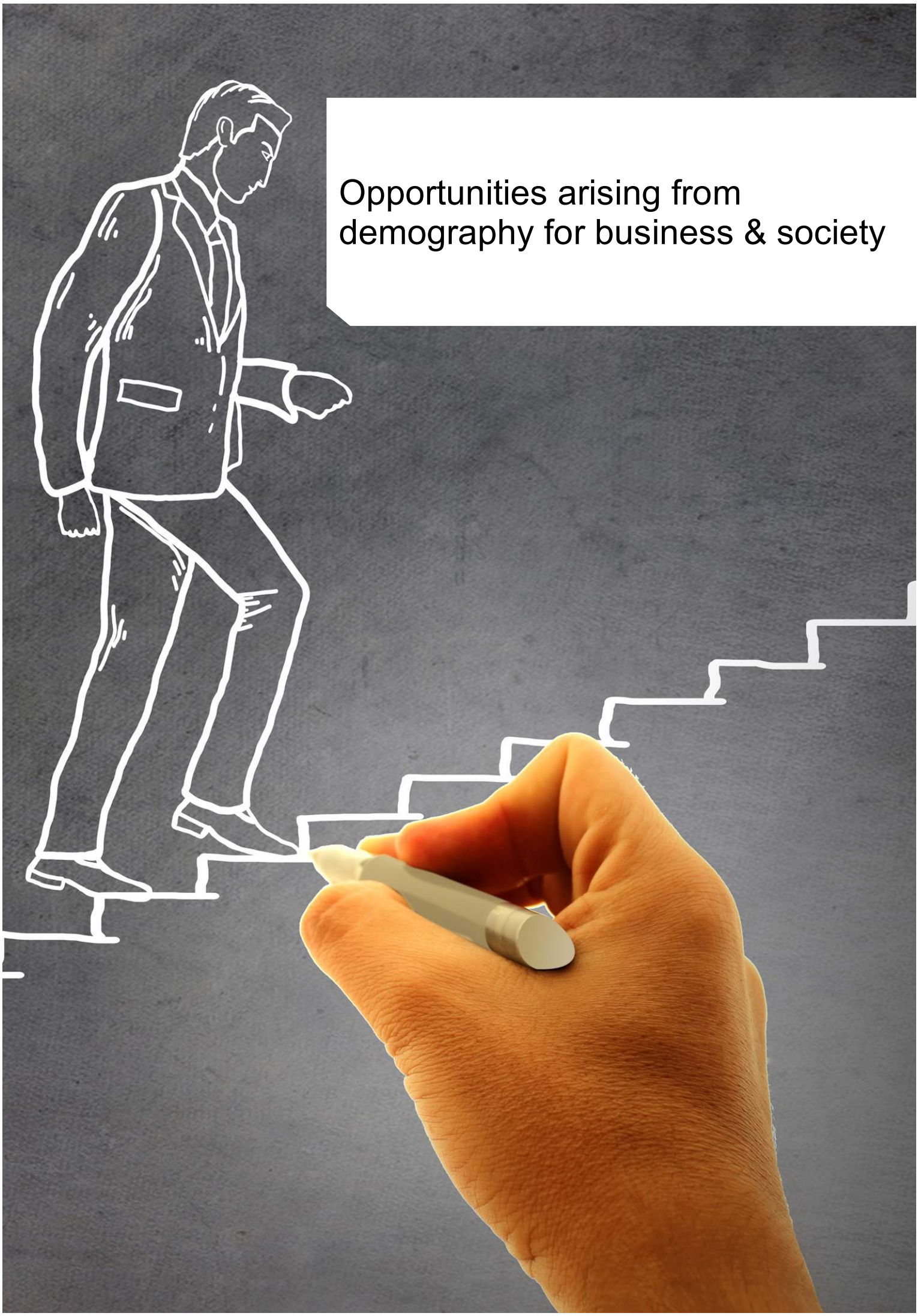
Source: UN, 2004, p.13

Figure*4*: Crude birth and death rate and rate of natural increase for the world



Source: UN, 2004, p.17

Opportunities arising from demography for business & society



E. Gender Equality: How does it influence fertility?

by Serena Garuti, Rodrigo Ferrari, Sherin Wanning

In the past decades, world's fertility has decreased approaching *replacement rate* of 2.1 children per woman that would keep global population constant. Such trend alarmed international governments and institutions. Indeed, decreasing fertility may potentially thin the foundations of our society. An old, not renewing world population would be doomed to face challenges caused by a shrinking labour force and rising welfare costs.

Today, the effect of gender equality on fertility is a hot topic in the academic and policy-making debates. As a matter of fact, the current state of research on the topic is still ambiguous as consensus is yet to be reached on the direction of this effect. Some researchers claim that women in more gender equal societies face higher opportunity costs of childbearing, thus being more inclined to have less, or even no children. This phenomenon seems to have characterized Europe in the past, where not only fertility rate is one of the lowest in the world, but also gender gap is the narrowest on a global level. Nevertheless, recent findings have shown a stabilization (or even increase) of the fertility rate for those countries, which are performing well in the social context of gender parity.

This paper aims to explain the impact of gender equality on fertility with a particular focus on Europe. An empirical analysis follows the theoretical study, and brings evidence towards the existence of a negative relationship between gender equality and fertility, moderated by economic development. The higher gender equality is in a certain country, the lower will be the expected fertility. However, this effect would be weaker in more developed countries compared to less developed ones. Directions for future research as well as key implications for policy makers are further discussed in the paper based on our findings.

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1. Introduction

While the world population has constantly been growing at considerable pace for hundreds of years, the global fertility rate has been shrinking for decades. While this overall number has not yet fallen below replacement rate, many developed countries are already experiencing low and even very low fertility rates below 1.5 children per woman. This development causes challenges for societies due to a decreased labour force and rising welfare spending for an ageing society. As a reason, rising gender equality is often accused to negatively impact fertility.

Chapter 2 of this report will analyse the global development and status quo of fertility and gender equality as well as their relationship, using secondary literature. It will also give an idea about the development of how country development can have an influence on this relationship.

Chapter 3 will perform an empirical research using a regression analysis to clarify the relation of the two, fertility and gender equality, considering development as a moderator. This analysis will use secondary data for European countries for the years 2007-2014.

Chapter 4 will discuss the findings and will give possible explanations for the outcomes. Following these, chapter 5 will show the limitations of the research and will explain the need for further research.

2. The development of fertility and gender equality

In previous years, the negative effect of rising gender equality on fertility has often been put into question. Low fertility rates below the replacement rate were expected to have an especially high impact on societies, their pension, economic and wealth structure. Hence, the topic has been discussed in a very broad, yet ambiguous matter. This chapter will point out why both, fertility and gender equality have a big impact on how we will live in the future and why the two are therefore worth studying. Furthermore, the public discussion on how and if these two are correlated will be further analysed using previous publications on the topic. As a third part, we will introduce the idea of how economic development can influence the before studies relationship. Lastly, it will be explained why Europe is an especially interesting area of research.

2.1 Why fertility and gender equality matter

Fertility and gender equality both have a direct impact on the quality of our everyday lives and the future of our society. To understand the status quo, recent developments and areas of interests, this chapter will closely analyse the two topics.

2.1.1 *Fertility*

In today's world, 119 countries have reported fertility rates below the replacement rate (taking the more drastic replacement rate of 2.1, given the sometimes used global replacement rate f 2.33 this number would be even higher) (The World Factbook, 2016).

The replacement rate defines the amount of births per women that are needed to replace a population within two generations. For developed countries, this rate equals 2.1 (D'Addio et al, 2006).

Many of the abovementioned 119 countries below replacement rate are even characterized by very low fertility rates below 1.5. Furthermore, countries of intermediate fertility, i.e. countries above replacement rate with up to five children are often characterized by steep declines in fertility in the recent years. Lastly, high fertility rates are only found in 8% of the world's population, that is women giving birth to more than five children on average (*see appendix 1*) (United Nations, 2015). Currently, the average global fertility rate is 2.5 children per woman.

Global fertility rates are expected to shrink to a mere rate of 1.99 around 2100 (Roser, 2015) after a decline to 2.4 children in 2030 and 2.2 births per woman in 2050 (United Nations, 2015).

Falling fertility rates bring various threats to societies. On the one hand, lower consumption rates as well as a shrinking labour force are feared to have a negative impact on the economy (Collins, 2014).

On the other hand, a shrinking population size can also create the challenge of an ageing society. While more and more people in the working-age today will be retirees in the near future, these retirees will face a decreased future working-age population.

This fact can create a rise in governmental spending for retirement benefits and can also increase the spending for health care that will have to be burdened by the abovementioned, much smaller generation of labour force (D'Addio et al, 2006).

Given these threats to society, the importance of fertility becomes clear, however, the reasons for the observed fertility decline remain somewhat unexplained. Many researchers have tried to explain what leads to the decrease in fertility rates, which are especially obvious in the developed world.

The lively discussion has provided a number of different influences: Some research papers argue that the decline of fertility rates is caused by the rise of contraception usage, decreasing the number of unplanned pregnancies (Europe the continent with lowest fertility, 2010).
Other researchers expect changing marriage patterns and unstable relationships to have a substantial effect on the number of born children per women (Worldwatch Institute, 2004). Apart from that, the rising costs of raising children in developed countries as well as the impact of governmental taxes, subsidies and regulations like parental leave and the availability and cost of childcare are discussed heavily (D'Addio et al, 2006).
Lastly, many researchers see a direct impact of rising gender equality on the decrease of fertility (OECD, 2010). It is claimed that the rising participation of women in the labour force and their more equal salaries severely lower fertility due to the resulting higher opportunity costs of giving birth (Bloom et al, 2009).

2.1.2 *Gender equality*

Gender equality has also been discussed strongly in recent years not only because of its disputable negative impact on fertility. The topic has been in the centre of many political discussions, claiming that equality for both, men and women, is a fundamental, human right that needs to be provided by any country.
In other debates, the importance of gender equality is motivated by the economic, social and political advantages gender equality can provide (World Economic Forum, 2015a). According to those, raising gender equality can lead to a wider pool of talents that can influence the economy positively, both in quantitative and qualitative ways (European Commission, 2016). Furthermore, countries close to gender equality have reported higher economic growth compared to countries with low gender equality (Müller, 2009).
On another note, gender equality leads to women's empowerment; their increased social participation can have an impact on the health situation of a whole generation due to higher education levels and raised economic opportunities (Yip & Tsang, 2015).

While gender equality is measured in slightly varying ways throughout different political and non-governmental organizations, they all come to a similar outcome: gender gaps in economic participation, remuneration, access to education and health care as well as participation in politics have continued to decrease in the last 10 years.
According to the data and measure of the world economic forum, in 2006, 64% of gender gaps were closed, followed by further 4% until 2016 (World Economic Forum, 2015b).

Gender parity was reported to be highest in Western Europe and North America and lowest in MENA (*see appendix 2*) (World Economic Forum, 2016).

Also, the rate of closing gender gaps is reported to be higher in developed countries than in developing countries (International Labour Organization, 2016).

Interestingly, gender gaps seem to affect certain areas of life more than others: While equality is globally almost reached in the areas of health and education, the subindices of economic and political participation still show high gaps of up to 77% (World Economic Forum, 2016). While the gap of political participation is the fastest closing gap of all the ones mentioned, having closed by 9% in the last 10 years, the economic gap remains as big as 41% with a closing rate of only 3% since 2006 (World Economic Forum, 2015b). In other words, following the recent development, it would take 70 more years to close the gender pay gap, only one of several indicators compositing the economic gender gap (International Labour Organization, 2016).

Given the fact that gender equality and especially economic participation of women is often directly linked to the fertility of a country, it is interesting to see how the development of both factors are seen to impact society in the future.

2.2 The influence of gender equality on fertility

Historically seen, it has often been claimed that with rising development of a country, the fertility of a country suffers. Most prominent, the Malthusian theory has stated that an economic-demographic paradox can be observed, i.e., the higher the GDP of a country rises, the lower the fertility of that country becomes (Malthus, 1826). In recent years, the focus of this argument has shifted a little. Instead of looking into the development of a country, researchers have focused on the relationship between gender equality and fertility and have come up with ambiguous and even contradictory results.

Moreover, recent studies often discuss the effect of a number of influences that might moderate the relationship of fertility and gender equality. These moderators include policies for parental or paternal leave, the availability of childcare amenities or the influence decreasing marriages (Andersson et al, n. d.).

In an attempt to sum up the previous literature on this topic, three main arguments can be identified: On one hand, it is being argued that rising gender equality leads to lower fertility as women plan their families more deliberately and spend more time caring about their own careers. This fact is strongly driven by the idea that in more gender equal countries the opportunity costs for women of having children are considerably higher (United Nations, 2011).

On the other hand, other researchers claim that the intention for childbearing and especially for subsequent childbearing could possibly increase with financial resource availability achieved through gender equal employment between parents (Neyer et al, n. d.).
A third type of research depicts gender equality to affect fertility in an U- or J-shaped association, often moderated by one or several moderators (Miettinen et al, 2011).
In this regard, Peter McDonald, professor at the Australian National University, has stated a theory on how policy makers can have an impact on the relationship of gender equality and fertility. To make his point, McDonald initially divides social institutions into two types: individual-oriented and family-oriented institutions. Simply said, individual-oriented institutions are establishment that focus on the development of an individual, like work or education. On the other hand, family-oriented social institutions focus on the family itself like childcare amenities.
According to McDonald, a mismatch of rather gender equal individual-oriented institutions and still comparably unequal family-oriented institutions has led to the fact of shrinking fertility rates (McDonald, 2007). He therefore argues that family-oriented institutions would need to undergo a substantial shift in order to achieve gender equality in order to attain desired fertility rates. According to McDonald, the responsibility for this shift lies with the policy makers of the respective country (McDonald, 2000).
Out of many different moderating factors, the economic development of a country has been popularly claimed to have a major effect on the relationship of fertility and gender equality. The next chapter will therefore analyse this factor more closely.

These different arguments not only differ in their direction and moderating factors, they often also specialize on certain countries. This report will therefore aim to give insight into the cross-national and time comprehensive relationship of gender equality and fertility in the analysis part.

2.3 Country development and fertility: a fundamental switch?

Even though the focus of most researchers had shifted away from the Malthusian economic-development paradox in recent years, a group of scientists claimed in 2009, that the effect of development on fertility should be revised (Myrskylä, 2011).
The respective report that has been prominently discussed since, states that while - similar to gender equality - country development may have a negative impact on fertility rates at first, given the amount of economic development tested, these results seem to be somewhat reversed after a certain amount of development. In other words, for highly developed

countries, a rise in fertility was monitored, resulting in a J-shaped relation between economic development and fertility (Fox et al, 2015).
The report suggests the trend of fertility at older reproductive age to be one of the main reasons for the findings (Myrskylä, 2011).
As an interesting fact, their analysis showed that this development is conditioned by gender equality. Only countries with both, high development and low gender equality showed a rise in fertility. Therefore, it is stated that for tackling the fertility challenge, countries need not only to invest into a countries development but also introduce ways and policies to support equality between men and women (Myrskylä, 2011).
This study provides an interesting possibility to clarify if there might be a further influence on fertility than merely gender equality. The effect of high economic development of a country will therefore be further analysed within our study.

2.4 Europe - a high gender equality, low fertility continent

In the whole debate on fertility and gender equality, Europe plays a very interesting role. While none of the European countries has reached gender parity yet, Europe is often seen as a role model in treating women and men equally, given Europe's good results in international comparisons (World Economic Forum, 2016).
However, the continent has also been characterized by fertility rates below the replacement rate since the early 1980s, in some countries even since the beginning of the 1970s (*see appendix 3*) (D'Addio et al, 2006). Thus, many voices and media have deemed a rather negative future for Europe despite global population growth (Akkoz, 2015) due to a growing, ageing population and a smaller new generation (Kassam et al, 2015).
Yet, major differences between countries can be observed, both, regarding their gender equality and fertility rate.
As previous reports and analyses were ambiguous and even contradictory, we deemed it necessary to run a research on the relation of gender equality and fertility in Europe.

2.5 Hypotheses

Given our previous research, we decided to run an empirical research that is both, considering cross-country data for European countries and time comprehensive (for details see chapter 3.2 Description of the Sample).
In our previous research we have found several contradictory arguments. We therefore felt the need to clarify the relationship between gender equality and fertility and to understand

the impact on highly developed European countries in this regard. Our research therefore aims to give understanding of two hypotheses:

Hypothesis 1: *Gender equality is negatively correlated to fertility*
Hypothesis 2: *Country development influences the relationship of gender equality and fertility positively*

3. Empirical Research

3.1 Method

In order to further investigate the relationship between gender equality and fertility we conducted a regression analysis, which ultimately resulted in the following model:

$$fertility = \beta_1\ gender\ inequality * \beta_2\ development * \beta_3\ gender\ inequality * development + \epsilon$$

Fertility here represents the dependent variable and is defined by the total fertility rate retrieved from Eurostat (Eurostat, 2016). Its values indicate the average number of children that would have been born by a woman over her lifetime if:

1. She were to experience the exact current age-specific fertility rates (ASFRs) through her lifetime, and
2. She were to survive from birth through the end of her reproductive life (The World Factbook, n. d)

Eurostat's measure for gender pay gap (average difference in percentage between men's and women's aggregate hourly earnings) serves as a proxy for *gender inequality.* Previous research tried to develop composite indexes for *gender inequality* by considering also educational and social indicators beyond the economic ones (World Economic Forum, 2016). In this study, however, according to the parsimony principle we adopted only gender pay gap as other educational and social variables were found to be strongly correlated with gender pay gap, thus potentially prone to generate multicollinearity issues in the regression.
Finally, *development* is here represented by values of GDP per capita in current K US$ retrieved from Worldbank. Limiting the emergence of collinearity with the other variables was the rationale for preferring a purely economic variable to composite development indexes that also include social factors.

3.2 Description of the Sample

The sample considered in our analysis consists of the EU28 countries plus Norway, Switzerland and Iceland. Indeed, current social and demographic conditions, together with availability and reliability of data, make the European continent an interesting area for our study. All the variables considered are based on yearly data that range from 2007 to 2014. The choice of such time frame was constrained by data availability and driven by the interest in the recent demographic dynamics.

3.3 Measure

The analysis started by verifying the presence of a relationship between *gender inequality* and *fertility*. Therefore, we ran a regression with the first as independent variable and the second as dependent variable. The model showed a positive relationship between the two variables: higher levels of *gender inequality* appeared to be associated with higher levels of *fertility.* Countries were codified with dummy variables and the constant was dropped as it would not have been appropriate to identify a 'base case' when comparing different countries. This is also likely to have determined the high values of R^2 observed in our models.

Several variables (i.e. female tertiary education, female employment, female part time employment) were considered in order to fully map gender equality. However, the tests highlighted high correlation levels between such independent variables, thus creating multicollinearity issues. From an econometric standpoint, pay gap emerged as the most significant and explanatory variable as it is more comprehensive than tertiary education and it also gives an idea of the quality as well as the level of employment.

Development was then added to our model and showed a significant ($p < 0.001$) positive relationship with *fertility*: more developed European countries are expected to have higher fertility rates. In order to further investigate the relationship between the two independent variables and *fertility,* we tested for the interaction effect between *gender inequality* and *pay gap.*

3.4 Results

This model is statistically significant ($p < .001$): the higher the gender inequality in a certain country, the higher we expect fertility to be.

However, this relation is moderated by the level of development in a certain country. More specifically: given the same level of gender inequality, higher development attenuates the

positive effect of gender inequality on the dependent variable. In other words, the positive relationship of gender inequality on fertility is much stronger for less developed countries than for developed countries.

Furthermore, intuition suggests the existence of a causal relationship between gender inequality and fertility. As we will further elaborate in the following sections, the opportunity cost of childbearing is likely to influence the intentions of having a child, while fertility seems to have a limited impact on gender equality.

Linear regression — Number of obs = 238; F(33, 205) = 4923.25; Prob > F = 0.0000; R-squared = 0.9965; Root MSE = .10308

fertility	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
pay_gap	.0318114	.0086324	3.69	0.000	.0147916	.0488311
gdp_pc_k	.0171487	.0037058	4.63	0.000	.0098423	.0244551
interaction3	-.0002415	.0002665	-0.91	0.366	-.000767	.000284

FIGURE 1: STATA REGRESSION OUTPUT (OWN ANALYSIS , 2016)

Gender inequality and *development* are both statistically significant ($p < .001$). While the $|t|$ value for the interaction variable is low, this can be explained by the presence of a strong (> .7) correlation between *gender equality* and *development.* Therefore, even if interaction is not strictly significant in our model ($p > .05$), we believe that this is determined by an issue of collinearity, which does not nullify the interaction effect.

The error terms of the overall model appear to be independent, normally distributed and homoscedastic, thus respecting the assumptions of linear regression. This, together with the direction of the causality effect analysed above, provides sufficient ground for us to exclude the presence of endogeneity issues.

3.5 Scientific Quality Criteria

Nevertheless, our analysis presents some limitations, which might constrain its validity and applicability. Firstly, the proxies used for gender equality and development might not adequately capture the complexity of the variables.

Secondly, since the scope of this research is bounded to European countries, the application of these findings to other non-EU countries might be contingent to some adjustments and/or further research.

Thirdly, statistical validity of the findings might be strengthened by looking at a longer time span. More observations would indeed increase the reliability and the significance of the study.

4. Analysis and interpretation

Our research suggests that, generally speaking, gender equality is negatively correlated to fertility. This means that the more equal women and men are in one country, it is to be expected that fertility rates are low. In countries of increasing gender equality, a decrease in fertility is to be expected.

In the past decades, we have seen an improvement of the gender parity gap almost all over the world. In particular, Europe has been a pioneer and virtuous example in its practises and policies. As one consequence, women's participation in the labour force as well as their economic income has increased. Parallel to this development, the fertility of European women has also decreased.

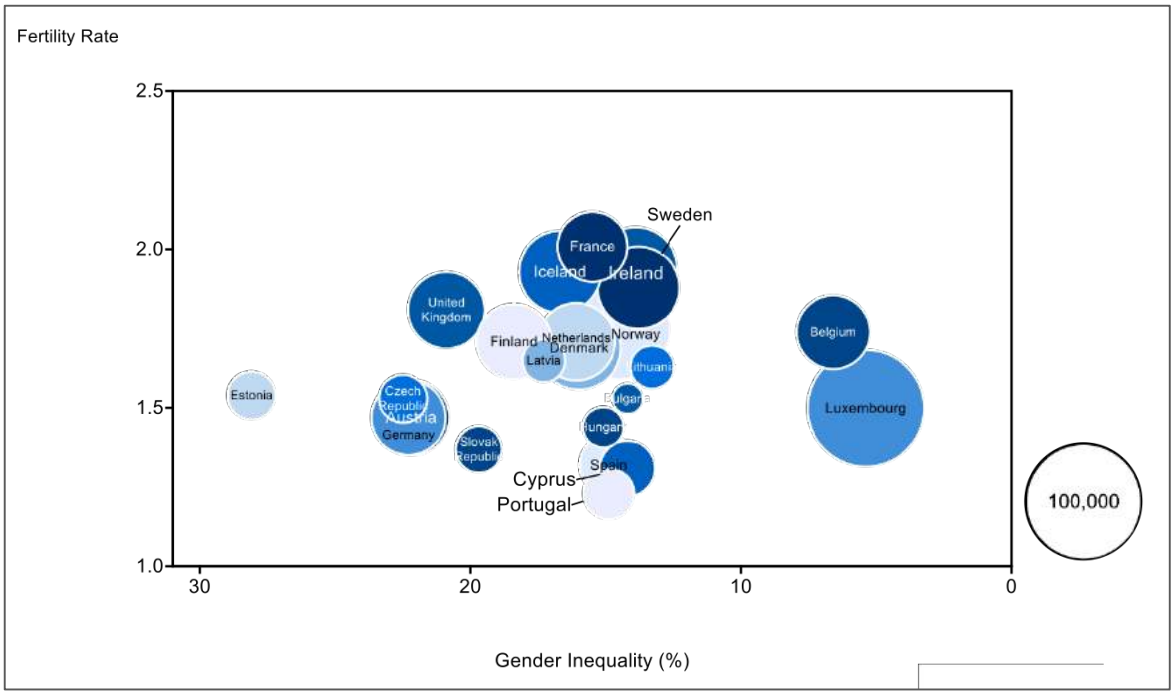

Figure 2: STATA Regression Output (Own analysis , 2016),

red circle: Countries that show rather low gender gaps at considerably high fertility rates

One possible interpretation of the data is that, due to increased gender equality, the opportunity costs of having children have risen for European women.
When a family decide to increase the size of their household and to add a new baby to the monthly bills, it does not only have to take into consideration the increase in the denominator of their income to standard of living ratio, but also the time invested and the potential reduction of working hours, wage and energies that the couple will have to face.
In fact, if women's education and employment achievements have reached more advanced levels, the potential earnings for potential mothers have also increased, influencing the opportunity costs and making the substitute costs between family and work even larger.
Our empirical findings have also shown that the negative relation between gender equality and fertility is weakened when the GDP per capita increases. Therefore, it can be expected that the higher the economic development at the same level of gender equality, the weaker is the expected negative effect on the fertility of European women.
Our findings therefore seem to support the theory of Myrskylä et al. that at high economic development rates the negative relation of fertility and development can be inversed, given low gender gaps. Rephrasing this previously stated example, one could say that the negative impact of gender equality on fertility is inversed or at least weakened as soon as high economic development is reached.
This theory would explain why certain countries like Sweden and Austria show both, comparably high fertility rates close to the reproduction rate while also having small gender gaps. Both countries benefit from what Myrskylä et al. defined as high economic development.

The reasons for this finding can be manifold, possibly stemming from a changed mindset of women in highly developed countries or caused by policies that enable women to have children while also pursuing a career. These policies might be especially advanced in highly developed and gender equal countries. However, our research does not identify clear causalities. It therefore encourages further research to understand this phenomenon (for details on further suggested research please refer to chapter 5.2 *Suggestions for further research*)

Therefore, we could conclude that the effect of gender equality on fertility is not necessarily negative per se. As our research suggests, it can be moderated by development factors.

5. CONCLUSIONS AND FURTHER RESEARCH

This final section of the paper has the intention to give a summary of our research, summing up first the main literature findings that have sparked our paper hypothesis, and then our empirical study with its evidence and limitations. Finally, we would like to mention a few points that we believe would deserve further research investment, due to our results and analysis restrains.

5.1 Summary

Having assessed the importance that modern demographers dedicate to 'fertility', the paper has identified a major risk for the advanced economies of the world to drift below the natural replacement rate of 2.1. As a matter of fact, the decrease in fertility would mean the necessity to readjust the socio-economy of these developed countries, where the work force and taxpayers would be diminished, while the cost for welfare and pensions would increase.

The main literature is ambiguous in determining the factors that influence fertility, and the direction of such effects. On the one hand, the main demographers of the past, such as Malthus and Becker, have claimed development and later gender equality to negatively influence fertility. They stated that an increase in economic development, as well as in gender equality, would have negatively impacted fertility. On the other hand, some researchers in the recent years have developed models that show an inversion of this demographic pattern. They argue that an increase in economic development and gender parity would not affect negatively the fertility ratio in the long run, but positively. Other researchers claim that moderating factors might influence the relationship of gender equality and fertility.

In an attempt to shed light on the aforementioned ambiguity, we decided to test the effect of gender equality on fertility. We decided to confine the geographic area of our research to the Europe area, due to its socio-economic characteristics. At the beginning, we observed a negative correlation between gender equality and fertility. However, inserting as interaction variable the economic development of the European countries, we could observe an alleviation of the negative effect.

Lastly, we gave possible interpretations for the observed findings. As a major possible reason it was conducted that due to rising gender equality the opportunity cost for women to decide for having children, also increases.
As a reason for the moderating effect of economic development on the relationship between fertility and gender equality, there are several possible explanations that are subject to further research.

5.2 Limitations

The varsity and ambiguity of the literature regarding the topic has sparked limitations to our research paper. However, these limitations can also serve as motivation for further research.
First, the definition of gender equality has not been distinct throughout previous literature. In fact, different governmental and non-governmental institutions use different variables and composite indices to describe gender equality. Using gender pay gap as a proxy therefore limits the significance of this research even though this simplification was deemed necessary, as described in chapter 3.

Second, the geographic scope of our research is restricted to the area of Europe, thus not being able to give insights into the relation of fertility and gender equality outside of this area.
Third, during our empirical analysis we used data series limited in time, ergo our analysis could be bounded in statistical significance.

5.3 Suggestions for further research

Even though a general negative correlation between fertility and gender equality was found in our research, there are still parts of our report that might motivate further research.
One particular area of interest could be the question to analyse more closely, why some European countries, which performed best in gender equality practises, such as Sweden and Austria, have also seen an increase in fertility rate. It would be interesting to understand what has further influenced these results.

On a governmental level, possible areas of influence could be national policies for families like parental leave or the availability of childcare facilities and tax structures. On a social level, further indicators regarding the equality of women and men as well as attitudinal factors might yield interesting results.

Furthermore, it might be validated if McDonald's theory of unaligned gender equality in individual- and family-oriented social institutions has an impact on European fertility as another possible explanation for the findings of this paper.

Lastly, analysing the relation of fertility and gender equality in non-European and especially developing countries could give an interesting insight into how our future world may look like and how arising demographic challenges can and need to be addressed in the next years.

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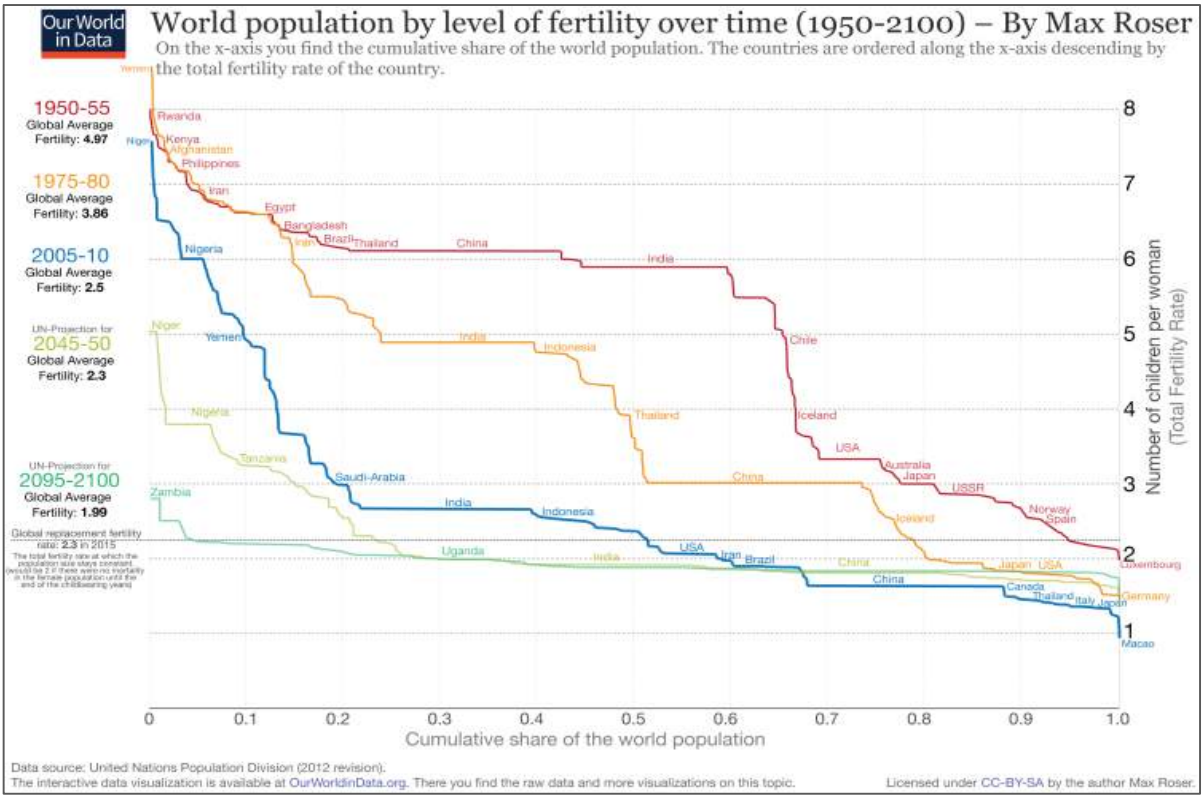
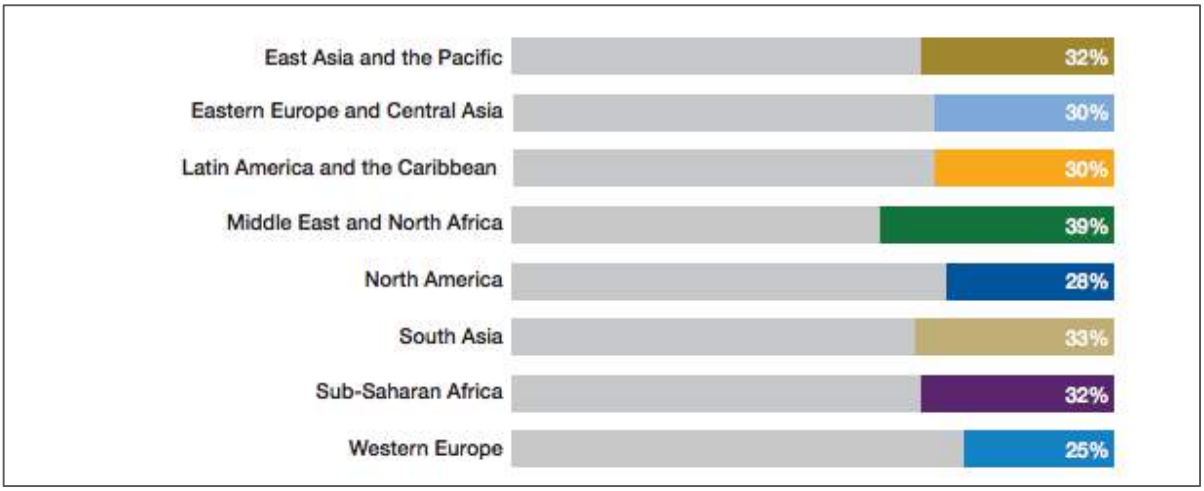
Figure 1: World population by fertility over time (1950-2100)



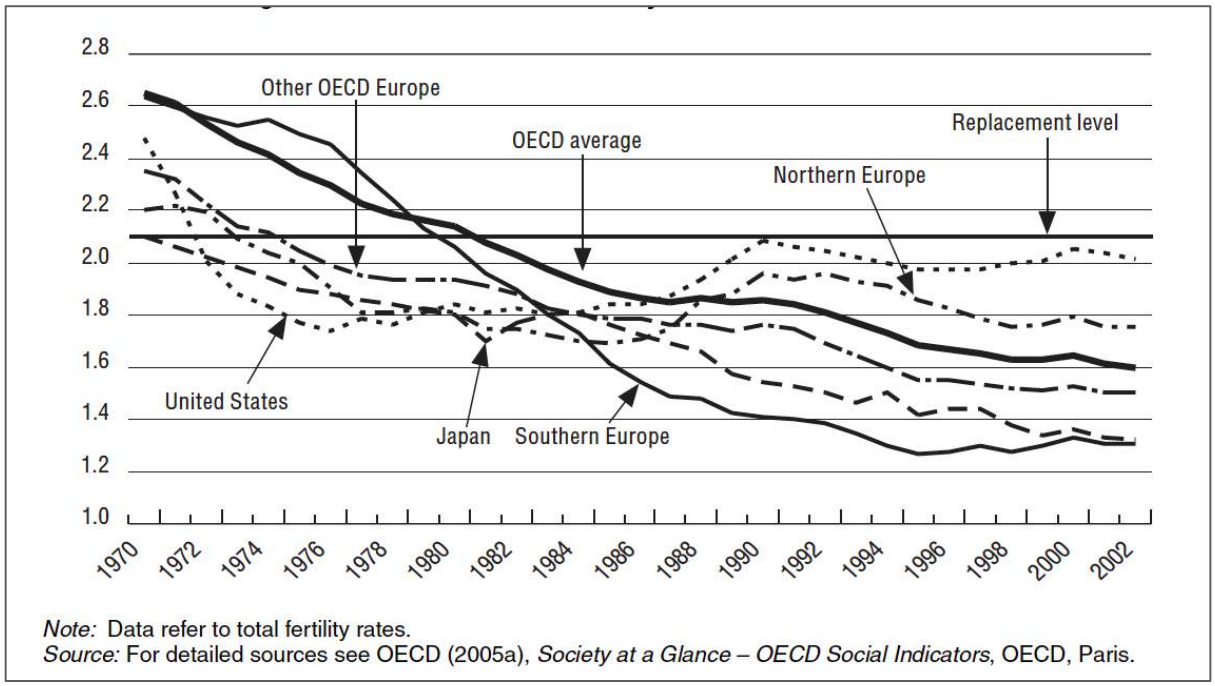
Source: Roser, 2015

Figure 2: Distance from gender parity 2016, by region



Source: World Economic Forum, 2016

Figure 3: Trends in total fertility rates in OECD countries



Source: D'Addio et al., 2015

The unique population dynamics of Switzerland

F. Shrinking Working Age Population Switzerland: Strategic recommendations to mitigate labour force shortages in the healthcare industry – an industry characterized by limited resources and growing demand due to ageing/ longevity

by Bálint Farkas, Monika Blandina Nuss, Jaime Alejandro Rivera Caballero

This paper makes strategic recommendations to mitigate the predicted additional demand for health labour force due to demographic change in Switzerland. It is thereby focusing on three specific issues: the image of the health care industry, transnational care and the propagation of Paro, a carebot. Whilst the first two issues aim at increasing the health labour force in Switzerland through national and international measures, the latter contributes to the question whether technological innovation will help mitigating health labour force shortage.

The paper concludes that transnational care will not be a feasible long-term strategy. Rather should the image of the occupation as well as the retention of personnel be increased to attract more people respectively to lower dropout rates. Additionally, further research on technical solutions to decrease the need for labour force need to be found as Paro increases patients' wellbeing but seems not to lower workforce requirements.

TABLE OF CONTENTS

1. Introduction

The “crisis in human resources” in the health sector has become important recently. In 2006, the World Health Organization (WHO) estimated that globally almost 4.3 million doctors, midwives, nurses, and other health care professionals were missing (Aluttis et al., 2014, p. 1). Whilst Switzerland is amongst those countries which’s health labour force supply lies above the OECD average now, discussions about health labour force shortages have started.

These shortages are *inter alia* due to the ongoing demographic change in Switzerland. Whilst the problem of an increasing old-age dependency ration (defined as the proportion of inactive population aged 65 and over to the active working age population) must be addressed generally (e.g. by an increasing retirement age or labour intensity) this paper will only focus on possible solutions for the labour shortage within the health care sector.

For this reason, part 2 of this paper provides an overview on the demographic change before informing about the health care industry in Switzerland and its labour organization. The third part of this paper will then make some strategic recommendations on how to mitigate labour force shortages. Finally, part four will summarize our findings.

2. Swiss Health Care Industry and Demographic Change

Switzerland’s health industry is characterized by limited resources and growing demand due to ageing/ longevity. The following chapter will therefore give an overview on the demographic change and on the health industry in Switzerland.

2.1 Demographic Change in Switzerland

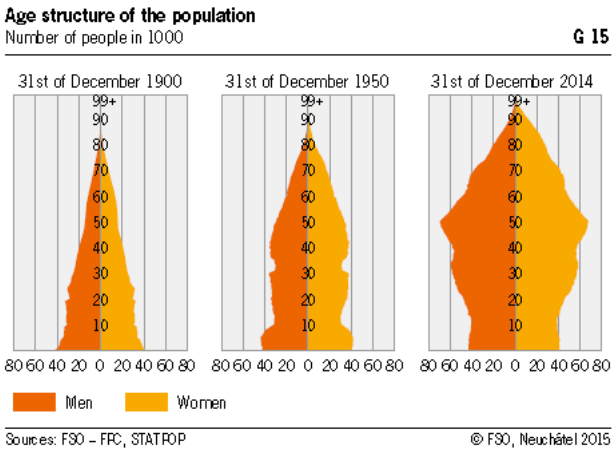


Figure 6: Age structure (FSO, 2015a, p. 25)

Switzerland’s population structure changed dramatically since 1900: Whilst the share of the population below age 20 shrank from 40.7% in 1900 to 20.2% in 2014 the share of elderly people (age 64+) increased from 5.8% to 17.8% during the same period (FSO, 2016, p. 3). By 2030 however, today’s structure will again change and the number of people aged 65 and older will significantly increase: Due to the higher life expectancy of the

65-year-old and the baby boomers reaching retirement age, it is assumed that the share of over 65s will increase by 670'000 (+4.8 %) by 2030. Additionally, the number of over 80s will increase by almost 50%. (FSO, 2015b, pp. 12-13; Jaccard Ruedin & Weaver, 2009, pp. 9-10) In real numbers this means that by 2030 2.17 million will be 65 and older and out of these, 690'000 will be 80 and older. (FSO, 2015b, pp. 12-13)

2.2 Health Care Industry in Switzerland

Switzerland's governance of its health care industry is characterized by diverse private and public actors which makes it quite complex.

Switzerland has one of the best and most efficient health care systems of the world. By combining privately and publicly regulated elements, it tries to find a balance between universal accessibility, efficiency and financial viability: On the one hand, a mandatory basic insurance, financed by a per capita premium, ensures that a publicly defined basic catalogue of services is provided for each inhabitant (accessibility). On the other hand, roughly 90 private insurance companies compete for the inhabitant's favour as they want to contract this obligatory basic insurance with as many inhabitants as possible. The ladder being completely free to choose, the insurance companies must accept every inhabitant regardless of age, sex or preexisting illnesses at least within the basic catalogue of services (efficiency and financial viability). (Sax, 2010, pp. 1-3)

This system, however, needs a complex regulatory background which is characterized by Switzerland's federal structure. The players involved are the federation, the cantons, the municipalities and private organizations. (Sax, 2010, pp. 3-7) In short, Switzerland's health care system is also one of the most expensive and complex systems in the world. Hence, adopting to the demographic change will be challenging and will depend largely on its ability to govern its labour force.

According to the OECD (2011, p. 88), Switzerland's health labour force supply lies above the OECD average with a ratio of 68.4 persons employed in the health and social sector per 1'000 population. With 10.15 professional nurses per 1'000 population and 4.76 associate professional nurses per 1'000 population, it is also above the OECD average for nursing, which lies at a lower average of 6.88 respectively 2.26. Finally, also the number of physicians, pharmacists, dentists and caring personnel per 1'000 population is higher than the OECD average. Only the ratio of midwives (0.28) lies below the OECD average (0.35).

However, discussions on health labour force shortages have been raised recently. Fears are that by 2030 between 120'000 and 190'000 health workers must be found (OECD, 2011, pp. 90-92). With regards to the sub-group of nursing staff alone, the additional need is seen at 65'000 additional nurses (Merçay et al., 2016, p. 74). These shortages are mainly due to a *numerus clausus* policy at the Universities which limits the admission of new students to become a physician; the freezing of the opening of new medical practices for practitioners working under the 1994 Health Insurance Law; epidemiological shifts, and changes in the characteristics. (OECD, 2011, pp. 90-94)

With regards to demographic change there are two main challenges for the labour force within the health care industry: On the one hand, Switzerland must be able to replace the part of those currently working which will be reaching retirement age or will drop out over the next 20 years. On the other hand and as described above, Switzerland is facing a dramatic demographic change which increases the demand for healthcare services. (Jaccard Ruedin & Weaver, 2009, p. 1)

If retirement age stays at the actual age (64 for women and 65 for men), approximately 20% of the labour force will retire by 2020, and 47% by 2030 (Jaccard Ruedin & Weaver, 2009, pp. 1, 7). This problem is intensified by the fact that early retirement is very common in the healthcare sector (Jaccard Ruedin & Weaver, 2009, p. 6) and that the replacing generation is characterized by a feminization of the medical workforce which goes along with more part time work and, hence, a worsening of the labour shortage problem (OECD, 2011, pp. 90-94). Additionally, a substantial proportion of nurses are older than 41 years. Since nursing is a physically demanding profession as patients need to be transferred, lifted etc., excessive fatigue, physical strain or accidents are high. (OECD, 2011, pp. 90-94) Therefore, the dropout ratio increases with increasing age and lies at 56% when aged 50 or older (Lobsiger et al., 2016, p. 3).

The second challenge lies within the increased demand for health care services due to the ageing of Switzerland's population. Mainly the above-mentioned increase of the proportion of the over 80s will lead to an additional need for long-term care, as they are mostly affected from chronic diseases. In 2009, this additional need was expected to number up to 80'000 by the year 2030. Whereby, this additional labour force will

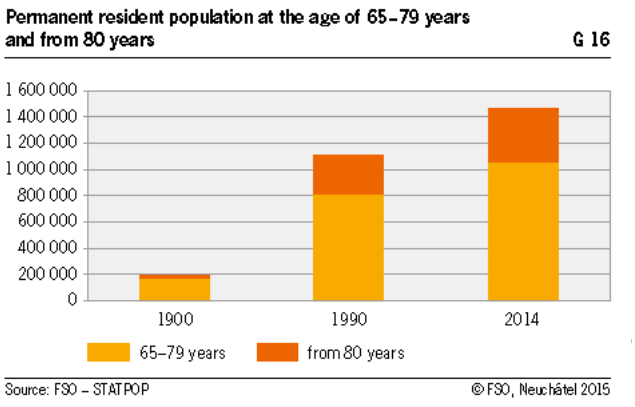


Figure 7: Resident Population (FSO, 2015a, p. 26)

by 90% be needed in long-term care institutions (homes, Spitex), but, precisely these institutions face the biggest losses due to retirement. Consequently, Switzerland must quickly find practical solutions to meet this additional demand. (Jaccard Ruedin & Weaver, 2009, pp. 5, 10-11; OECD, 2016, p. 21)

3. STRATEGIC RECOMMENDATIONS

Due to the demographic change, Switzerland will need a bigger health care labour force. Furthermore, and also due to the demographic change, this additional need of labour force will be very difficult to be met by persons aged between 18 and 20 as this number will drop by 1-2% annually (Jaccard, Ruedin & Weaver, 2009, p. 8).

To meet this additional demand, this paper focusses on three specific issues: the image of the health care industry, transnational care and technological improvements. It will thereby mainly focus on general practitioners and nurses.

3.1 Image of the Health Care Industry

According to a recent research and a study named “The nurses at work”: Investigating nurses’ career paths over the last 40 years in Switzerland of the Swiss Health Observatory (OBSAN), there is a direct negative relation between insufficient nursing staff levels and the quality of health care. To address this situation, it is necessary to consider two variables. Firstly, the number of new nurses coming into the labour force. Secondly, it is necessary to understand the main factors for people with nursing skills to decide to stay in the health sector during their working lifetime or drop the profession. (Addor, 2016, p. 1). The main factors determining the number of nurses available in the health system are recruitment, training and retention (Addor, 2016, p. 1).

3.1.1 *Recruitment in the Health Sector*

As outlined in the previous chapters, the health care industry is predicted to be growing. For example, it is estimated that the employment in the sector will grow by 16% in the next ten years within the North American Market (U.S. Bureau of Labour Statistics, 2016, Registered nurses summary). Especially for the male population, this fact can be used as an argument for recruitment as it would improve the image of the profession. If it is combined with an adjustment of the salaries that nurse educators perceive in relation to the years of schooling required, it would increase the incentives to choose a health profession. (Rossman, 2011, p. 80)

Furthermore, there are some best practices from other countries such as the United States where they used recognized people in the society with masculine roles in order to reverse the negative stigmas and connotations associated with male nursing as well as. (U.S. Bureau of Labour Statistics, 2016, Registered nurses summary): They became endorsements of this career for marketing campaigns (e.g. Are you man enough to be a nurse? campaign) Additionally, they sent male nurses as speakers to high schools in career fairs where teenagers are deciding their future profession. Another example of this is the concept "Every mother is a nurse in their own right" used in the US. (Rossman, 2011, p. 81).

Finally, it is necessary to create incentives for universities to change the policy to increase the limits of admission for new students for medical schools, for example at the Universities of Bern, Basel, Fribourg and Zurich.

Recommendation 1:

Capture new talent and improve the image of the profession by increasing the efficiency and efforts aimed for recruitment, especially for men: This can be addressed in Communication campaigns and by allowing Universities to open admission for students for medical schools.

3.1.2 *Training in the Health Sector*

Another way to improve the image of the health system is to improve training: offering online learnings could be used as an alternative to promote the profession. By fostering this option, schools would not need more physical space for all the potential students and actually reach a bigger student base. (Rossman, 2011, p. 80).

Furthermore, initiation programmes where nurses can work in teams with nurses and patients has a positive effect on decreasing stress levels and job related injuries. Additionally, it increases the nurse's self-confidence and quality in the service for patients. (Rossman, 2011, p. 76). If sustained with continuous follow-up, once the nurse starts working, the effects of implementing this measure can be harvested. A successful measure in this sense could be the creation of a digital community. (Powell, 2003, pp. 74-76)

Recommendation 2:

Improve training in the health sector: This can be done by offering online learnings, by creating initiation programmes for nurses and by creating digital communities.

3.1.3 *Retention in the Health Sector and Satisfaction with Current Job*

Finally, it is necessary to encourage loyalty to the health sector (Addor, 2016, p. 1). By analysing the reasons why people stay in or leave the profession, job satisfaction can be increased.

Overall, nurses who participated in the survey were satisfied with their current job, whether working within (88%) or outside (85%) the health sector at the time of the research.

The most important factors that help explain the high levels of this satisfaction were autonomy empowerment, being able to use and develop skills, work atmosphere, internal communication, having accurate and available information to complete their tasks, support from colleagues and the hierarchy, and work recognition (by patients, patients' families, colleagues and managers). Also, the percentage of nurses satisfied with the quality they can provide was very high 84%.

However, there were some other factors were satisfaction was globally lower. For example, this was evident regarding flexibility of schedule (66% for nurses working in health system), patients-to-nurse ratio, workload (60% satisfaction for nurses working in health system vs. 72% outside health), and institutional development opportunities (50%).

Furthermore, the main problems identified were the ones related to participation in decisions (only 38% of nurses satisfied in the health sector and 30% outside) and burnout (28% vs. 26%) as well as the salary (51% vs. 62%).

The strongest reasons for leaving the health sector were "too little identification with the profession", "wanted more time for personal life", "eager to discover a new profession", "lack of support from hierarchy", "start a new course of education".

Recommendation 3:

Address main reasons for leaving the profession to maintain overall job satisfaction in the sector: This can be done by improving working conditions and flexibilities in schedule that can allow a better balance between work and personal life. Some additional measures could be related to adjusting pay scales. Furthermore, it is necessary to include retention measures early in the career of the nurses because that is the moment with highest number of people leaving the profession. (Addor, 2016, p. 7) Finally, increase the efficiency of nurse's work and liberate them of some difficult task. This could be done by incorporating robotics to improve the working conditions of the nurses. For example, this technology is useful to lift patients with limited mobility. (Rossman, 2010, p. 77).

3.1.4 *Analysis and Interpretation*

But, will the above-mentioned recommendations fulfil their goal?

Effects on the labor shortage

As only 6% of the nurses reported that they do not work as nurses anymore it seems that the retention strategy to address the problem does not seem to be as relevant as assumed (Addor, 2016, p. 7). Therefore, the strategy to mitigate the shortage of health labor will be more effective if it focuses on attracting new talent and improving the image of the profession, rather than on retaining the existing force.

Feasibility/Cost

The recommendations formulated to improve the image of the sector seem to be easily implemented. However, there is a major investment required for marketing purposes aimed to change some negative connotations and to expect results in a middle to long term period.

Acceptance

The biggest challenge is to change some perceptions associated with the profession. This is the case mainly with the negative associations to male nursing and the perception of lower income. These efforts will require a longer period to show the expected results but it is a risk that should be taken, considering that the status quo is not a solution for the future situation of the sector.

Intermediate summary

However, in the short- and middle run, these efforts will not be enough and must be backed by transnational care efforts as will be outlined in chapter 3.2. Furthermore, in the long-term efficiency of the existing, health labor force will have to be increased as will be addressed in chapter 3.3.

3.2 Transnational Care

As mentioned in the previous chapter, only half of the needs for nurses at national level are educated within Switzerland each year (Addor et al., 2016, p. 1). The following chapter will, therefore, analyze how transnational care might help dealing with the shortage in health labor force.

3.2.1 *Possibilities in Switzerland*

Switzerland is highly profiting from international migration: On the one hand, the share of migrant health workers is of importance for *hospitals* as in 2010 an estimated 39% of ancillary health personnel, 38% of professional health care givers, and 35% of doctors and

other university based health professionals were migrants. (OECD, 2011, p. 103; OECD, 2016, p. 107) On the other hand, care-migrants, i.e. persons responsible for the care of elderly people within *private households*, have increased since the introduction of the free movement of people within the EU/EFTA (Van Holten et al., 2013, pp. 10, 17-18).

The reasons why these health workers migrate lie both in pull and push factors. The latter are less attractive working conditions, political instability, and other reasons in the countries of origins (Forcier et al., 2004, p. 14). Whilst Switzerland cannot influence these push factors it can influence the pull factors such as opportunities for professional training, offers of higher wages, and other incentives (Aluttis et al., 2014, p. 3; Forcier et al., 2004, p. 14).

Recommendation 4:

Increase the pull factors for nurses and for general physicians: The former can be done by fair remuneration, flexible working hours, and other incentives (cf. Merçay et al., 2016, p. 78). The latter can be done by lifting the ban for the opening of new medical practices. The negative effect of an oversupply of specialists or of physicians in urban areas can be met with fiscal regulations such as punishments for specialist/urban practices respectively incentives for generalists/rural practices.

Another possible approach could be to reduce the limitations given by communication difficulties. As 43% of the people living in Switzerland speak two or more languages in their daily life, whereby – besides the national languages German, French and Italian – English and Portuguese are the two foreign languages most often mentioned (FSO, 2016, pp. 4-5), the recruiting practice for foreign nurses or general physicians could focus on people speaking one of these languages. This would limit the necessity to speak the language spoken locally right from the beginning of the stay of the health worker in Switzerland.

Recommendation 5:

Offer incentives to create and promote hospitals or nursing homes for patients speaking another language than the language spoken locally: This could be done by building language hotspots such as special floors at hospitals or nursing homes, advertisement for such institutions, and/or reducing the per capita premium for the mandatory basic insurance if one of these institutes is chosen.

3.2.2 *Possibilities Abroad*

Internationally, trends show that increasing numbers of elderly people spend their lives in warmer places: e.g. for Japan, studies showed that places that are “cheap, near, warm” are especially favoured (Ono, 2010, p. 99). However, this emigration might not always lower the problem of health labour shortages in the home country: A study on Danish retiree migrants showed that when, due the local care culture (i.e. where care is mainly supplied within family structures), institutional care supply was insufficient, retirees went back to Denmark the moment they became dependent on others’ help (Blaakilde, 2015). To avoid such returnees, the Japanese government planned in 1986 to build Japanese villages in foreign countries, but, had to step back from these plans because they were heavily criticized as “exporting the elderly”. Only when the private sector took over, the project became more accepted. (Ono, 2010, p. 96) Also in Switzerland, people started to place their elderly relatives suffering from dementia in Thailand (Jorio, 2014; Langenegger, 2016; Stormer, 2011).

Recommendation 6:

Support private initiatives for Swiss retirees in foreign countries that include local care services: This can be done by including such care-services in the catalogue of services of the mandatory basic insurance. Thereby, following the Japanese study, the countries chosen should be cheap, near, and warm, e.g. Mediterranean countries.

3.2.3 *Analysis and Interpretation*

But, will the above-mentioned recommendations fulfill their goal?

Effects on the labor shortage

The strategy to employ foreign personnel effectively mitigates the actual shortage of health labor force in Switzerland by a very high percentage.

Feasibility

However, the strategy to employ these foreign personnel will make Switzerland reliant on those countries (OECD, 2011, p. 103). Furthermore, it contradicts its obligations resulting from the Global Code of Practice on the International Recruitment of Health Personnel (“Global Code”). Under this code, each country is responsible to independently build up a sustainable health labour force, thereby minimizing the labour force needed from abroad since the consequences of the otherwise occurring brain drain are considered unjust and unethical (Aluttis et al., 2014, p. 3; Merçay et al., 2016, p. 77).

Domestically, it might also be very difficult to manage the foreign labour force. This is especially true for the idea of language hotspots, as enough people must opt for this service. Therefore, feasibility is only given for a short- or middle-term horizon with regards to an international perspective and depends highly on the domestic acceptance with regards to language hotspots.

Acceptance

It will be difficult to find acceptance for foreign personnel in Switzerland. Not only have the Swiss citizens voted against free movement of people within the EU/EFTA in 2014, but also the acceptance of foreigners in the extremely private sphere of care is limited. Even if that person speaks the same language, as with regards to the idea of language hotspots, it could be difficult to find acceptance from the possible patients, as critics for double standards might arise.

Furthermore, building Swiss villages in foreign countries might be considered arrogant by these countries. Also, the acceptance of Swiss retirees and patients might be difficult: Not only will they depend on administrative requirements like immigration laws, and institutional requirements like supply of care services. But also, they will depend on personal requirements like language skills or the ability to deal with cultural obligations. Especially the latter might contradict the care of people with dementia in a foreign country as it might still be considered as “exporting the elderly” (Stormer, 2011).

Costs

One positive aspect of hiring foreign personnel is the costs: Not only is the education of this personnel payed by the country of origin but the migrants might also accept lower wages than Swiss personnel. However, benefiting in this way was accused by the WHO (Aluttis et al., 2014; Merçay et al., 2016, p. 77).

Intermediate summary

In the long-run, there will be no other sustainable solution than to create a greater supply of health workers in Switzerland by ways outlined in chapter 3.1 or to improve efficiency of the existing health labour force. How this might be done will be addressed in chapter 3.3.

3.3 Paro the robot seal

The recommendations above dealt with the objective to increase labour force in the health sector. However, to cope with the aging population this might not be enough. Hence, the following chapter deals with the possibility to reduce the amount of care needed by

technology and thereby mitigate labour shortage. More precisely, the chapter focuses on the application of Paro, a robot seal specifically built to accompany people with dementia.

3.3.1 *Introduction*

Currently, around 119'000 people suffer from dementia[15] in Switzerland. Approximately 8% of the over 65-year olds have the illness, while it strikes more than 30% of the over 90-year olds. Due to the demographic development in Switzerland, there will be around 200'000 people with dementia in the year 2030. In the year 2050, it will possibly reach to 300'000 individuals, and as of today, dementia is already the most common reason for the need of care of the elderly. (Schweizerische Alzheimervereinigung, 2015)

Kraft, Marti, Sommer and Werner (2010, p. 4) estimated the total cost of dementia in Switzerland at CHF 6.26 billion. While medical costs of treating dementia is very low, over 90% of the costs are caused by either institutional care, summing up to CHF 2.9 billion, or informal care[16], valued at CHF 2.8 billion (Kraft et al., 2010, p. 4). Hence, looking for efficiencies in the care sector just makes sense, not only to reduce the costs but also to mitigate labour shortages in nursing staff.

In Japan, 20% of the current population is 65 or older. While the amount of seniors is arising further, the number of caregivers stagnates. By 2025, a shortage of 1 million care staff is forecasted by a Merrill Lynch report. Considering these numbers, it is not surprising that Japan is the global leader in developing robots that can assist the elderly, also referred to as carebots. In fact, Japan is spending one-third of the government's budget on their development. Existing devices are "Resyone" by Panasonic which is able to transform itself from a bed to an electric wheelchair and vice versa and "Robobear" a humanoid robot that is capable of lifting people and transferring them between beds and wheelchairs. Both robots eliminate the need of multiple nurses. (Muoio, November 20, 2015)

Besides heavy lifting and many other tasks related to healthcare, a nurse's everyday job consists of showing love and care towards their patients by using open communication. People often take this for granted. However, in the recent years, robots are being sold to keep seniors company. "Paro" for example is a therapeutic robot covered as a fluffy seal. Its purpose is to accompany elderly patients with dementia. (Saavedra, 2015)

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[15] "Dementia is a syndrome in which there is deterioration in memory, thinking, behaviour and the ability to perform everyday activities" (WHO, 2016).

[16] Informal care is non-paid and usually carried out at home by the relatives of the sick person. The costs were hereby calculated by the replacement method which "values time spent on informal care at the market price of a close market substitute" (Kraft et al., 2010, p. 4).

3.3.2 *Scientific Research on the Effectiveness of Paro*

An early study by Kidd, Taggart and Turkle (2006, p. 3976) shows an increase in social interactions after introducing Paro in two local nursing homes – an effect that could be further increased by the participation of the caregivers. However, they also suggest that caregivers should closely manage the amount of time the residents are interacting with Paro because for some residents "caring for" Paro becomes too exhausting over time. Furthermore, they think that Paro would be more useful if it were lighter and smaller in order to being more controllable by the users. Some residents even perceived Paro as strange and therefore frightening. In spite of the observed shortcomings of Paro, Kidd et al. conclude that Paro clearly offers entertainment, something to talk about and a welcoming break in the routine of the often-dull social setting in eldercare facilities.

A more recent study by Broadbent, MacDonald and Robinson (2016, p. 106) shows also very similar results as the one stated above: They observed that some residents were able to engage on an emotional level with the robot seal, while some even held it for a real animal. Broadbent et al. also revealed that the residents not only enjoyed sharing and interacting with Paro but also talking about him to other human beings.

Bemelmans, Gelderblom, Jonker and de Witte (2015, p. 946) also proved the effectiveness of Paro by conducting a study in six Dutch care institutions with a total of 91 residents suffering from dementia. They examined the short-term effects as well as the facilitation of daily care activities by applying Paro. Concerning the facilitation of daily care activities, they could not observe any significant effect. However, their results state that Paro can increase the quality of care and the quality of life of the residents when applied in individually defined interventions. In conclusion, they suggest that Paro should only be seen as an additional tool for care, and not as a replacement of care staff.

3.3.3 *The Perception of Paro in Switzerland*

In 2012, Paro was introduced to a nursing home in Lucerne, Switzerland. The subsequent media hype was huge and mainly consisting of upset commentaries on online-platforms. To protect the dignity of the residents, neither pictures nor videos were taken, and even the "Schweizer Fernsehen" was refused admittance. However, the nursing home claims to make only positive experiences when applying Paro. (Kaps, 2015, p. 7)

Margrit Lüscher, the director of a nursing home in the canton of Zurich also ordered a Paro for her institution. Thereafter, some people called her nursing home to be a disgrace, while others were wondering whether she intends to economize on care staff by introducing the

robot. Lüscher clearly denies the allegation that she wants to cut down on labour. According to her, the robot should rather assist the nurses in cases when words or other forms of approaching the patients do not work anymore. (Marquard, January 24, 2015)

Another introduction of Paro in Switzerland was made in the Hospital of Muri, which borrowed the seal for a two-week trial period. In the evaluation of the experiment, half of the care staff assessed the application of Paro to be positive, the other half did not. Hence, the acquisition plans were put off for the present – a decision that could be influenced by the fact that many nurses are already afraid of being replaced by robots. (Kaps, 2015, p. 8)

3.3.4 *Analysis and Interpretation*

In the year 2014, 2000 Paros were living in Japan (Schneider, 2014). Many studies on the effectiveness of applying Paro clearly show positive results concerning the patients' lives and the quality of care (see Broadbent et al., 2016, pp. 106–112; Bemelmans et al. 2015, pp. 946–950; Kidd et al., 2006, pp. 3972–3976). However, it seems like there are only a handful of Paros applied in Switzerland. What might be the reason for this marginal distribution?

Effect on mitigating labour shortage

Japan is obviously preparing itself for a huge shortage in care staff by heavily investing in carebots. Concerning this matter Paro's role remains unclear. There are dozens of academic studies dealing with Paro's effectiveness and how it should be applied but not about how much a nursing home can save by replacing certain activities with the application of Paro. At the same time, the directors of nursing homes deny the allegation that they want to cut down on labour by introducing Paro.

Acceptance by the Stakeholders

Even if the effectiveness of Paro is scientifically proven, when it comes to accompanying Paro in elderly care facilities, people in Switzerland are irritated as seen in the media response after introducing Paro in nursing homes (see Kaps, 2015, p. 7; Marquard, January 24, 2015). Furthermore, the nursing home in Lucerne explicitly denied open communication with the public.

Feasibility & Costs Related to the Implementation

Paros are already being applied in Japan for more than 10 years and at least since 4 years in Switzerland. Furthermore, a Paro costs between CHF 4000 and 5000.- (Schneider, 2014), which carries no weight relative to general health care costs in Switzerland. Hence, the feasibility is theoretically given, while the costs are easily manageable. The barriers of the application of Paro lie mainly in the acceptance of the robot as explained above.

According to Manzander (cited in Kaps, 2015, p. 8) the smaller fear of contact and higher acceptance of robots in Japan might be connected with the Shintô-religion, that not only worships nature but objects as well, and also with the Japanese's general enthusiasm for technology. However, this explanation does not seem to capture the whole reality when considering the fact that, with a population of 300 pieces, the highest number of Paros per capita live in Denmark (Quelle).

Recommendation 7:

Further introduce Paro in particular care institutions where the residents are open towards this new kind of technology and where the relatives of the patients also approve of this step. However, the acceptance of carebots should not be pushed aggressively in Switzerland but might come as well over time. Therefore, the application of Paro should only take place under the close surveillance of professionals for now, since the effectiveness heavily depends on the performance of the caregivers and can be enhanced by their participation. Additionally, openly communicate about the use of Paro in order to inform the public and dismount the fear of contact with this new kind of technology with regard to the next generation that will get in need of care.

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4. Summary, Limitations and Further Research

A very important part of the health debate is regarding the increasing costs. However, due to the huge scope of that subject, this paper decided to touch it only marginally and instead focus on measures to influence the number of labour force needed.

Furthermore, the data considered for this paper lacks important groups of people: Not only people who left the healthcare system but also workforce in the ambulatory sector were difficult to reach. Therefore, incentives to stay within the healthcare system and the situation of general physicians and of care-migrants are underrepresented. Contrarily, younger nurses who graduated in the recent years are overrepresented, probably because they are more techsavy and more web/internet friendly users. (Addor, 2016, p. 4; Van Holten et al., 2013, pp. 10, 17-18)

Concerning Paro, the effectiveness on mitigating labour shortages is questionable. No academic papers could be identified that show a significant facilitation of daily care when applying the carebot. On the contrary, research advocates surveillance and participation on behalf of the caregivers and additionally recommends training for care staff on how to use the robot seal. To reduce labour force, Paro itself needs be further developed to a level that the patients can deal with it autonomously. At the same time, further research should be conducted to find out the relevant success factors related to the high acceptance of Paro in Denmark. Concerning culture, Switzerland seems to be much closer to Denmark than to Japan. The identified success factors could then be applied to Switzerland to enhance Paro's acceptance.

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G. Das 100-jährige Leben in der Schweiz: Wie leben und arbeiten Regula (26 Jahre) und Urs (26 Jahre) in einer Zeit der Langlebigkeit?

by Sarah Bigler, Lars Hartmann, Nicole Rufer

Das 100-jährige Leben zu meistern, wird für die heutige Generation eine der grössten Herausforderungen. Alle Lebensbereiche werden sich an das 100-jährige Leben anpassen müssen, sei es das Arbeitsumfeld, private Beziehungen und Netzwerke oder wie die Generationen zusammenleben. Regula und Urs werden im Laufe ihres 100-jährigen Lebens durch mehrere Transitions-Phasen gehen, welche nach Flexibilität und Anpassungsfähigkeiten fragen. Die beiden werden deutlich länger als ihre Vorfahren arbeiten und ihr Leben entsprechend anpassen. Ebenso müssen verschiedene Akteure, wie die Regierungen oder Unternehmen, pro-aktiv diesen Veränderungen entgegenkommen, um den heutigen Lebensstandard aufrechtzuerhalten und weiterentwickeln zu können.

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1. Einleitung

218’000 produktive Stunden gibt es in einem 100-jährigen Leben zu füllen. Das ist an sich schon eine Herausforderung. Doch das 100-jährige Leben wird einen Einfluss auf alle Lebensbereiche haben und unsere Lebensmodelle komplett revolutionieren. Umso wichtiger ist es, dass sich jedes einzelne Individuum pro-aktiv auf das 100-jährige Leben vorbereitet.

Diese Arbeit stellt einen ersten Schritt der Auseinandersetzung dar und beleuchtet die vielfältigen Konsequenzen des 100-jährigen Lebens. Themen wie längeres Arbeiten, neue Finanzierungsmodelle und Investitionen in immaterielle Werte stehen im Vordergrund. Ein kurzer Exkurs in das Leben unserer Grosseltern und Eltern zeigt auf, weshalb diese Fragen gestellt werden sollten. Anhand der Lebensskizzen von Regula und Urs zeigen die Autoren ihre Vorstellungen des 100-jährigen Lebens auf. Verschiedene Transitionen prägen das Leben der beiden Akteure und stellen sie vor neue Herausforderungen. Abschliessend wird im Rahmen der „Agenda for Change“ identifiziert, welche Interessensvertreter Verantwortung übernehmen müssen, um für das 100-jährige Leben gewappnet zu sein.

2. Das 100-jährige Leben

Noch vor wenigen Jahren war das Erreichen des 100. Lebensjahrs eine Ausnahme und ein Ereignis, welches Nachrichtenwert hatte - die heutige Generation wird diesen Meilenstein deutlich häufiger erreichen. Die höhere Lebenserwartung beeinflusst unsere Lebensgestaltung und stellt die Menschheit vor Veränderungen, welchen viele nicht gewachsen sind.

2.1. Konsequenzen des 100-jährigen Lebens

Ein längeres Leben bedeutet, dass sich die einzelnen Lebensabschnitte stärker in die Länge ziehen. Im Gegensatz zu unseren Eltern und Grosseltern wird die heutige Generation nicht länger ein sogenanntes Drei-Phasen-Leben, bestehend aus Ausbildung, Arbeit und Rente, durchlaufen (Gratton & Scott, 2016, S. 10). Das 100-jährige Leben ist geprägt von neuen und verlängerten Phasen und vermehrtem Wandel.

Aufgrund besserer medizinischer Betreuung, Ernährung und Ausbildung sowie dem technologischen Fortschritt sowie ansteigendem Bruttoeinkommen hat sich über die letzten Jahrzehnte der Gesundheitsstandard der Durchschnittsbevölkerung deutlich verbessert (Gratton & Scott, 2016, S. 30). Doch nur, wenn man auf ein längeres Leben vorbereitet ist, kann man die zusätzliche Zeit zu seinen Gunsten nutzen und einen Mehrwert daraus ziehen.

Aus diesem Grund muss sich die Generation Y bewusst mit dieser Veränderung auseinandersetzen und kann nicht einfach das identische Lebensmodell der Eltern anstreben.

Neue Lebensmodelle eröffnen viele neue Chancen sowie Herausforderungen und werfen Fragen auf, wie auf diese reagiert werden soll. Eine dieser Fragen ist, wie die nachhaltige Finanzierung eines verlängerten Lebens aussehen soll. Ein längeres Leben verlangt mehr finanzielle Ressourcen, um die zusätzlichen Lebensjahre finanzieren zu können. Das hat zur Folge, dass Individuen entweder vermehrt sparen oder länger arbeiten müssen. (Gratton & Scott, 2016, S. 38) In der heutigen Konsumgesellschaft ist verstärktes Sparen höchst anspruchsvoll und verlangt eine genaue Zukunftsplanung. Damit man sich die Finanzierung der Pensionierung mit fünfzig Prozent des finalen Lohnes leisten kann, muss eine Person des 100-jährigen Lebens jedes Jahr mindestens 25 Prozent des Einkommens zurücklegen, wenn sie sich mit 65 Jahren pensionieren wollen. Da dies für den Einzelnen herausfordernd bis unmöglich ist, gehen Gratton & Scott (2016, S. 57) davon aus, dass sich die Mehrheit der Gesellschaft dafür entscheidet, länger zu arbeiten und die Pensionierung nach hinten zu verschieben.

Diese Annahme hat konsequenzenreiche Auswirkungen auf die zukünftige Arbeitswelt. Bereits heute zeichnet sich ab, dass die Arbeitstätigen nicht ihr ganzes Leben der gleichen Tätigkeit nachgehen. Diese Entwicklung wird sich im Rahmen des 100-jährigen Lebens nochmals verstärken. Die Konsequenzen aus diesem Wechsel sind vielfältig. Zwei besonders wichtige Aspekte sind dabei die vermehrte Unsicherheit, mit der die Arbeitstätigen umgehen lernen müssen sowie die daraus entstehende Notwendigkeit, flexibler zu werden. Dadurch, dass eine Arbeitsstelle nicht mehr auf Lebenszeiten sicher ist und der Arbeitsmarkt somit kompetitiver wird, sind die Arbeitsnehmer verstärktem Druck und Unsicherheit ausgesetzt. Dazu kommt, dass sich die Arbeitswelt durch Megatrends wie die Digitalisierung und technologischem Fortschritt ständig verändert. Dabei wird sich auch der Arbeitsplatz stets verändern. Sogenannte Impact Hubs und Co-Working-Spaces bieten zukünftig verstärkt Plattformen, welche Austausch zwischen verschiedenen Parteien ermöglichen und somit Synergien schaffen (Schäpper-Uster, 2016). Um im Arbeitsmarkt zu bestehen, müssen die Arbeitsnehmer flexibel sein und mit diesen Veränderungen mitgehen (Gratton & Scott, 2016, S. 61). Dies hat zur Folge, dass sich Arbeitsstellen in Zukunft fliessender ausgestalten. Arbeitnehmer werden stetig ihre Positionen ändern und über den Zeitraum ihrer Arbeitstätigkeit in den Rängen auf- und absteigen. Diese Dynamik ergibt sich aus dem späteren Pensionsalter. Gratton & Scott (2016) gehen davon aus, dass ältere Arbeitnehmer

(älter als 65 Jahre) vermehrt Positionen auf einem tieferen Rang, beispielsweise Junior Stelle, besetzen werden. Diese Annahme setzt wiederum ein Umdenken und Flexibilität voraus.

Es zeigt sich, dass das 100-jährige Leben ernstzunehmenden Einfluss auf die materiellen Werte unseres Lebens haben wird. Doch wie gestalten sich die immateriellen Werte im Rahmen eines verlängerten Lebens? Diese Frage ist deutlich schwerer zu beantworten, da es äusserst schwer ist, in immaterielle Werte zu investieren. Um dieser Frage auf den Grund zu gehen, unterscheiden Gratton & Scott (2016, S. 90) in drei unterschiedliche Kategorien immaterieller Werte. Wissen und Fähigkeiten beschreiben die sogenannten produktiven Werte. Durch die starke Veränderung der Lebensumstände ist es essentiell, dass Individuen Wissen und flexible Fähigkeiten akquirieren, welche sie im Arbeitsmarkt gefragt machen. Weiter ist es wichtig, dass man Empathie zeigen kann und fähig ist, in einem Team zu funktionieren. Die zweite Kategorie umfasst Werte der Vitalität, wie die mentale und physische Gesundheit sowie Freundschaften und Familienbeziehungen. Diese Werte werden oftmals als Mass für ein gutes Leben verwendet (Gratton & Scott, 2016, S. 90). Um der Unbeständigkeit und schnellen Veränderungen des 100-jährigen Lebens positiv entgegen treten zu können, ist die Gesundheit und ein enger, verlässlicher Freundeskreis essentiell. Abschliessend stellen Gratton & Scott (2016, S. 112) die neu benötigten Werte der Transformation vor. Diese Werte beschreiben die Fähigkeit und Motivation, sich erfolgreich zu verändern und anzupassen. Eine Investition in die transformativen Werte ist von besonderer Wichtigkeit, da dadurch Unsicherheiten, die sogenannten Veränderungskosten, deutlich reduziert werden können.

Selbstreflexion und ein Bewusstsein über die eigene Identität vereinfachen zusätzlich den Umgang mit den Herausforderungen des 100-jährigen Lebens, welches ebenfalls einen immensen Einfluss auf unsere zwischenmenschlichen Beziehungen hat. Traditionelle Beziehungsmodelle werden seit einiger Zeit vermehrt in Frage gestellt. Dies wird sich in der Zukunft kaum ändern. Durch die Veränderungen in der Arbeitswelt und dem sozialen Umfeld passen sich auch die Rollen in einer Beziehung an (Gratton & Scott, 2016, S. 225). Um das Risiko einer Trennung zu vermindern, sind erhöhte Flexibilität und gegenseitiges Verständnis unabdingbar (Gratton & Scott, 2016, S. 224).

2.2. Das Leben unserer Eltern & Grosseltern

Die Generation, welche das 100. Lebensjahr erreicht, ist vielen Veränderungen ausgesetzt. Um diese bestehen zu können, muss sie automatisch ihre Lebensplanung und ihren Lebensstil anpassen. Ein Leben nach dem Vorbild der Grosseltern und sogar nach dem der Eltern ist aufgrund der Implikationen des 100-jährigen Lebens kaum mehr möglich. Um dies im Kontext der vorliegenden Arbeit besser nachvollziehen zu können, werden nachfolgend zwei stereotypische Lebensmodelle aufgezeigt.

Das Leben unserer Grosseltern war geprägt vom zweiten Weltkrieg. Durch die Unsicherheit und drohende Gefahr aus dem Nachbarland waren viele unserer Grosseltern stärker an die Familie gebunden und kannten nicht so viele Freiheiten wie die heutigen Generationen. Die Rollenverteilung zwischen Mann und Frau war traditionell, und viele der Mädchen mussten in der Familie helfen bis sie einen angesehenen Ehemann gefunden hatten. Die Männer folgten oftmals ohne Diskussionen in die Fusstapfen des Vaters und machten eine Ausbildung in jenem Metier.

Erst nach der Heirat war es angesehen, dass Mann und Frau im gleichen Haushalt wohnten und ihr Elternhaus verliessen. Auf dem Land kam es jedoch oftmals vor, dass mehrere Generationen zusammenlebten, um beispielsweise einen Gast- oder Bauernhof zu bewirtschaften. In der Ehe gab es klare Aufgabenteilungen. Der Mann brachte das Geld nach Hause, während sich die Ehefrau um die Kinder und den Haushalt kümmerte.

Aufgrund des Krieges und den daraus folgenden Implikationen war das Leben unserer Grosseltern von weniger Freiheit und einem kleineren sozialen Radius geprägt.

Bereits die Generation unserer Eltern konnte starke Veränderung zwischen den Generationen erleben. Die positive Entwicklung der Weltwirtschaft und die ersten Ansätze der Globalisierung ermöglichte ihnen mehr Freiheiten und die Möglichkeit, ihr Leben individueller zu gestalten. Viele unserer Eltern erlangten ein höheres Ausbildungslevel als ihre Eltern und hatten dadurch grössere Gestaltungswege in ihrer beruflichen Laufbahn.

Die grössere Freiheit zeigte sich vor allem darin, dass unsere Eltern vermehrt internationale Reisen unternahmen und Freunde beziehungsweise Bekannte innerhalb eines grösseren geographischen Radius hatten.

Trotz der Liberalisierung der Gesellschaft waren die Rollen innerhalb einer Familie noch relativ traditionell. Der Mann war grösstenteils der finanzielle Versorger, während sich die Frau um Kinder und Haushalt sorgte. Vermehrt arbeiteten Frauen aber nebenbei in einer Teilzeitposition und trugen dadurch zum Haushaltsbudget bei. Im Vergleich zu unseren

Grosseltern war eine berufliche Umorientierung für unsere Eltern schon deutlich einfacher und gesellschaftlich besser angesehen.

3. Zwei Szenarien des 100-jährigen Lebens

Es zeigt sich, dass das 100-jährige Leben Einfluss auf all unsere Lebensbereiche haben wird. Um diesen Herausforderungen gewachsen zu sein, ist es essentiell, Veränderungen frühzeitig zu antizipieren und ihnen pro-aktiv und mit genügender Flexibilität entgegen zu treten.

Im nachfolgenden Abschnitt wird aufgezeigt, wie das 100-jährige Leben aus der Sicht der Generation Y aussehen könnte und welche Vorstellungen und Ansprüche sich diesem Leben stellen.

3.1 Das 100-jährige Leben von Regula (26)

Regula ist im Jahr 1990 geboren, hat eine zwei Jahre jüngere Schwester und ist nach der Scheidung ihrer Eltern, da war sie 13 Jahre alt, in einer typischen Patchwork-Familie aufgewachsen. Vor der Scheidung lebten ihre Eltern das typische Modell: der Vater ging arbeiten und die Mutter blieb bei den Kindern zu Hause.

2018 (28)

Im Jahr 2018 schliesst Regula ihren Master in Business Innovation an der Universität St. Gallen ab. Bereits neben ihrem Studium hat Regula 50% im Innovationsmanagement eines Weiterbildungsinstitutes gearbeitet. Durch ihre Arbeit kommt sie viel mit dem Impact Hub in Zürich in Kontakt. Sie ist absolut begeistert von dieser Community und wie alle voneinander lernen können. Aus diesem Grund entschliesst sie sich, die restlichen 50% als Mitarbeiterin beim Impact Hub aufzustocken und der Community beizutreten. In diesen Jahren stellt sich Regula in ihrem Arbeitsleben ein Portfolio mit verschiedenen Tätigkeiten zusammen. Einerseits durch die Kombination von Studium und Arbeit, wobei sie beim ersteren wertvolle Beziehungen knüpft und durch das zweite an Arbeitserfahrung gewinnt und so ihre produktiven Werte doppelt stärkt. Das zweite Portfolio bildet sie durch das Ausführen von zwei verschiedenen Job-Arten, wobei sie durch ihren bisherigen Job die finanziellen Werte verbessert und die restliche Zeit sich der Community widmet.

In dieser Zeit baut Regula auch ihre vitalen Werte auf. Sie schliesst Freundschaften, die vor allem für ihr späteres Leben entscheidend sein werden, achtet stets auf eine gesunde

Ernährung und findet Gefallen an Yoga und dessen Philosophie. Schon seit sie 23 Jahre alt ist, hat Regula ihren Freund Peter, und sie kann sich gut vorstellen, mit ihm ihr Leben zu teilen.

2020 (30)

Mit 30 beschliesst Regula, nochmals reisen zu gehen. Bereits mit 20 war sie acht Monate im Ausland, wobei sie Zentralamerika und die USA bereiste und in Playa del Carmen und San Francisco eine Sprachschule besuchte. Dieses Mal möchte sie mit ihrem Freund Peter nach Asien. Während sie umherreisen, treffen sie viele verschiedene Leute und lernen viele Kulturen kennen. Vor allem von der japanischen Kultur sind sie besonders fasziniert und beschliessen daher, länger dort zu bleiben. Regula ist ein grosser Fan von japanischem Tee und wollte schon immer ihr Wissen darin erweitern. Sie beschliesst daher, ein Teeseminar zu besuchen und arbeitet danach ein halbes Jahr in einem Teehaus. Sie lernt japanisch, und durch die Arbeit im Teehaus lernt sie viele neue Leute kennen. Regula ist sich bereits vom Studentenleben gewohnt, mit eher weniger Geld auszukommen und zieht dies gleich weiter. Dafür erlebt sie eine Zeit der Entdeckung und Abenteuer und lernt über sich selbst vieles dazu. Durch das Reisen kommt Regula mit ganz anderen Lebensweisen in Kontakt und wird so gezwungen, über ihre eigenen Werte und Prioritäten nachzudenken.

2021 (31)

Nach einem Jahr beschliessen Regula und Peter, wieder zurück in die Schweiz zu kommen. Einerseits weil sie das Leben in der Schweiz vermissen und andererseits, weil Peter ein Jobangebot in der Schweiz als Umweltingenieur erhalten hat und Regula das Angebot, ihren Job im Innovationsmanagement als Vollzeitstelle wieder anzunehmen.

Viele Freundinnen haben „das Kinderkriegen auf später“ verschoben und zum Teil sogar ihre Eizellen einfrieren lassen. Regula möchte dieses Risiko nicht eingehen und bekommt im Alter von 32 Jahren mit ihrem Mann Peter den gemeinsamen Sohn Levi, zwei Jahre später die Zwillingsmädchen Chloé und Anna. Da sie sich in all den Jahren eine gute Position in ihrem Job erarbeitet hat, ist sie jeweils gleich wieder nach einer Babypause zurück zur Arbeit. Peter hat sein eigenes Start-up gegründet und kann daher ohne Probleme die Kinder ab und zu mal mit zur Arbeit nehmen, oder er arbeitet von Zuhause aus. Allgemein handhaben sie es so, dass Regula zu 60% arbeitet, Peter zu 80%, und zwei Tage sind die Kinder in der Krippe, bei den Grosseltern oder bei Freunden, die ebenfalls Kinder haben. Zudem hat Regula das Glück, dass sie ebenfalls ohne Probleme von Zuhause aus arbeiten kann, sodass sie teils auch gut zu 80% arbeiten kann. Für Regula ist es enorm wichtig, dass sie

Familie und Job gleichzeitig haben kann und dass Peter ebenso viel zu den Kindern schaut wie sie. Um stets auf dem neusten Stand bezüglich Arbeit und Kindererziehung zu bleiben, macht Regula laufend mooc-Kurse oder besucht Weiterbildungsseminare. Nachdem Regula eine neue Kombination von Portfolio hinter sich hat, in welchem sie einerseits ihre vitalen Werte durch die Familie gestärkt hat und andererseits ihre transformationellen Werte durch den stetigen Switch, beschliessen Regula und Peter, wieder auf Reisen zu gehen, dieses Mal als Familie.

2030 (40)

Da Regula beim Reisen gesehen hat, dass viele Kinder wegen fehlender digitaler Lehrsysteme zum Teil noch einen enormen Schulweg auf sich nehmen müssen, beschliesst sie, ihr eigenes Start-up in diesem Bereich zu gründen. Ein paar Freunde, die sie von der Uni kennt, sind ebenfalls von der Idee begeistert und helfen ihr dabei. Durch Crowd-Sourcing haben sie rasch das nötige Startkapital zusammen und durch das Netzwerk, das Regula beim Impact Hub nach dem Studium geschlossen hat, wird ihre Idee schnell bekannt. Das nötige Wissen erhält sie durch den Besuch von Seminaren in der Community, in welcher erfahrene Unternehmensgründer das wichtige Wissen weitergeben oder durch Online-Seminare. In diesen Jahren als unabhängiger Produzent lernt Regula enorm viel über ihre Fähigkeiten und investiert viel in ihre immateriellen Werte durch neue Netzwerke, den Aufbau einer Reputation und das Erlernen von vielen verschiedenen Fähigkeiten, welche sie auf jeden Fall für die Zukunft brauchen kann.

2035 (45)

Durch ihre Präsenz im Internet wird Regula schnell bekannt und von einer Versicherung angefragt, das interne Weiterbildungssystem auch bei ihnen auf den neusten Stand zu bringen. Regula kann ihr breites Wissen, das sie sich durch die Gründung des Start-ups angeeignet hat, sehr gut anwenden, jedoch hat sie Mühe, plötzlich in einem Corporate Umfeld zu sein. Es geht ihr einfach alles zu langsam in so einem grossen Betrieb. Trotzdem entwickelt sie ihre produktiven Werte weiter, da sie nun auch lernt, ihre Fähigkeiten in einem Corporate Business anzuwenden und ihre Erfahrung erweitert.

2042 (52)

Nach 5 Jahren hat sie genug und entschliesst sich, eine Auszeit zu nehmen. Sie überlegt sich, was sie will und wie sie ihre Zukunft gestalten soll. Dies fördert stark ihre transformationellen Werte. Da ihr die Bewegung als Ausgleich schon immer sehr wichtig war und in den letzten Jahren ihre vitalen Werte ein wenig zu kurz kamen, beschliesst sie, nach

Indien zu gehen und eine Ausbildung als Yogalehrerin zu absolvieren. Zusätzlich entschliesst sie sich, wieder in eine Community zu gehen, in welcher sie junge Start-ups coachen kann. Da ihr jedoch die nötigen Fähigkeiten dafür fehlen, macht sie noch einen Abschluss im Coaching.

2045 (55)

Nochmals stellt sich Regula ein Portfolio zusammen, dieses Mal mit der Kombination Coaching von Start-ups und Yogastunden. Ihre transformationellen Werte kann sie dabei gut gebrauchen, und sie schafft damit, eine gute Balance zwischen finanziellen, produktiven und vitalen Werten zu finden. Zudem hat sie genügend Zeit für ihre Kinder und Enkelkinder.

2060 (70)

Nachdem sie über die Jahre gut gespart hat, möchte sie mit Peter unbedingt nochmals nach Japan gehen. Inspiriert von ihrer Reise beschliessen sie, zusammen ein japanisches Teehaus in der Schweiz zu eröffnen. Beide haben schon viel Start-up Erfahrung, jedoch fehlt ihnen noch das spezifische Wissen. In den Hubs sind alle Altersgruppen anzutreffen, und daher finden sie schnell Experten, die sie über die Eröffnung eines Teehauses informieren können. Durch Online Kurse lernen sie das zusätzlich notwendige Wissen, und durch ihr Netzwerk wird ihr Teehaus schnell zum Erfolg. Nun arbeitet Regula zum Teil auch mit ihren Kindern oder Enkelkindern im Teehaus und führt parallel dazu noch ihre Yoga Lektionen durch.

2075 (85)

In ihrem Teehaus arbeiten sie immer noch ab und zu und gehen so viel wie möglich reisen, alleine oder mit ihren Kindern, Enkelkindern oder Urenkelkindern. Während der Zeit in der Schweiz wohnen sie in einer generationengerecht gebauten Wohnung in einer altersdurchmischten Siedlung in Zürich, in welcher sie bereits interessante und produktive Beziehungen zwischen den Generationen geschlossen haben. Auch jetzt sind Regula und Peter noch viel in den Hubs anzutreffen und geben ihr Wissen weiter oder schenken den Jüngeren Zeit, indem sie Aufgaben wie Kinder-hüten oder Sachen-reparieren übernehmen.

3.2 Das 100-jährige Leben von Urs (26)

Auch Urs wird im Jahr 1990 in der Schweiz geboren, hat eine drei Jahre jüngere Schwester und wurde im Alter von 14 Jahren ein sogenanntes Scheidungskind. Von da an war es normal, dass Mutter und Vater arbeiten, während zuvor eine klassische Rollenverteilung mit

dem Vater als Ernährer vorlag. Aus Aktivitäten im Leistungssport nimmt Urs bereits früh zahlreiche nützliche produktive Werte fürs spätere Leben mit. Neben einem gewissen Ehrgeiz und Zähigkeit zählen dazu vor allem Skills auf der sozialen Ebene wie Teamgeist und Führungskompetenzen.

2017 (27)

Nach einem - aufgrund des Berufseinstiegs nach dem Bachelor und der andauernden parallelen Berufstätigkeit - etwas verlängerten Masterstudiengang darf sich Urs jetzt M.A. HSG in Unternehmensführung nennen und verfügt mit dem theoretischen Wissen in der Tasche und den gesammelten mittlerweile vier Jahren Berufserfahrung als Sales Account Manager im IT Umfeld wiederum über neue Werte, die ihn bestens gerüstet machen für die Zukunft. Die finanziellen Werte verbessern sich zwar stetig, aber bis auf eine kontinuierliche Investition in die 3. Säule fehlt bisher eine langfristige Perspektive. Da Urs nach vier Jahren im Beruf langsam aber sicher die Zeit für eine Veränderung gekommen sieht und auch eine gewisse Flexibilität erhalten möchte, orientiert er sich nach einer kurzen Verschnaufpause neu und geht mitsamt Freundin Sybille, mit der er bereits 2013 zusammengezogen ist, und dem aufgebauten Haushalt auf unbestimmte Zeit in die USA, genauer ins Silicon Valley. Bevor Urs und Sybille ihre neuen Jobs in Übersee aber in Angriff nehmen, realisieren sie eine gemeinsame Auszeit von sechs Monaten, um die Welt zu bereisen. Zunächst bleibt Urs dem bisherigen Arbeitgeber treu und tritt in der neuen Heimat innerhalb des Konzerns eine neue Stelle an, was auch die Übersiedlung sowie alle damit verbundenen Administrativa merklich vereinfacht. Die in der Heimat aufgebauten vitalen Werte können dank moderner Kommunikationsmittel bewahrt und durch einen zusätzlichen, neu aufgebauten Freundeskreis noch erweitert werden. Daneben findet Urs durch das Ende der Doppelbelastung durch Studium und Beruf auch wieder mehr Zeit für Sport und diverse Hobbies zum Ausgleich zum Alltag.

2019 (29)

Bald schon merkt Urs aber, dass er beruflich eine neue Herausforderung in einem neuen Umfeld braucht. Nach seinen Erfahrungen bei einem Branchenführer, wo er sich wertvolle Skills im Verkaufsbereich, Einblick in Strukturen, branchenspezifisches Know-how sowie ein grosses Netzwerk an Kontakten zulegen konnte, möchte Urs von nun an seine gesammelten produktiven Werten aus der Praxis mit der im Studium gelernten Theorie verbinden und sich in einem dynamischeren Umfeld einbringen, in welchem es noch Raum für Gestaltung sowie Möglichkeiten zur gezielten Einflussnahme gibt.

Da neben ihm auch Partnerin Sybille Vollzeit arbeitet (DINK), kann er das erhöhte finanzielle Risiko eines Start-ups gut verkraften, und sollten alle Stricke reissen, so könnte man noch immer zurück in die Schweiz, wo einen das stabile soziale Umfeld auffangen würde. Doch es läuft gut, und Urs wird nach erfolgreichem Aufbau einer Vertriebsorganisation Teilhaber und darf die Geschicke des Unternehmens fortan als CEO lenken.

2025 (35)

Nach nunmehr sechs Jahren im Unternehmen, vier davon in leitender Position, einigen sich die Inhaber mit Microsoft über ein Übernahme-Angebot, mit dem alle Beteiligten einverstanden sind. Urs wird eine Position im Linienmanagement von Microsoft in Redmond, Washington angeboten, die er jedoch dankend ablehnt. Ein langes Gespräch mit Sybille, die Urs inzwischen geheiratet hat, bei einem guten Wein auf der Veranda hat ergeben, dass die Zeit für eine Rückkehr in die Schweiz gekommen ist. Sie vermissen trotz allem ihre Familien und Freunde in der Heimat und möchten diese vitalen Werte wieder aufbauen. Zuvor wollen sie aber mit einem Wohnmobil den Nordamerikanischen Kontinent während eines Jahres kreuz und quer bereisen.

Nur wenige Monate nach der Heimkehr erblickt dann auch eine gesunde Tochter Alicia das Licht der Welt. Urs wird daher zum Alleinverdiener, während Sybille erst einmal für unbestimmte Zeit eine Auszeit nimmt, jedoch mit der klaren Vorstellung, wieder in den Beruf zurückzukehren. Um dies auch bewerkstelligen zu können, nimmt sie an regelmässigen Weiterbildungen teil und absolviert ein Zusatzstudium an einer Fernhochschule. Beide müssen ihr Portfolio erweitern, um fortan als Familie zu funktionieren. Urs hatte dank seines Netzwerks und des in den Staaten absolvierten MBAs schnell Angebote für Stellen innerhalb der IT Branche. Er kann sich aber nicht mehr vorstellen, in ein grosses Unternehmen zurückzukehren. Daher wird aus einer spätnächtlichen Schnapsidee mit Kollege Thorsten, einem Unternehmensberater, plötzlich sehr schnell Realität, und die beiden gründen zusammen ihre eigene Beratung, welche sich vor allem auf digitale Geschäftsmodelle sowie den Standort Schweiz spezialisiert. Während Thorsten vor allem gefestigte Kenntnisse im Beratungshandwerk mitbringt, steuert Urs seine IT Erfahrung und seine zahlreichen Kontakte aus Übersee bei, muss aber noch eine Weiterbildung im Bereich Start-up absolvieren, um sich für die neuen Herausforderungen gewappnet zu fühlen. Schnell finden sich Start-ups aus dem Silicon Valley, welche nach Europa expandieren wollen und denen Urs und sein Partner fortan helfen, in der Schweiz Fuss zu fassen. Urs zieht dazu in den Kanton Zug, in welchem er die Sitze der Kundenunternehmen ansiedelt, wobei dieser Schritt gerade wie gerufen kommt, da erneut Nachwuchs ansteht und die Familie nun mehr Platz braucht.

2031 (41)

Das Beratungsgeschäft mit den ausländischen Unternehmen floriert, Urs und Thorsten konnten mit zahlreichen Angestellten ihr Geschäft erweitern und sind eine renommierte Adresse in ihrem Business. Ehefrau Sybille arbeitet mittlerweile wieder zu 80%, was dank den flexiblen Arbeitsbedingungen von Urs sowie einem Zusammenspiel von Grosseltern und Kita überhaupt kein Problem darstellt für die beiden Kinder Alicia (5) und Sven (3). Als nun aber der Geschäftspartner Thorsten ihn mit dem Entscheid konfrontiert, sich fortan voll auf eine angestrebte Karriere als Golf-Profi konzentrieren zu wollen, sieht Urs den Zeitpunkt gekommen, sich einmal mehr beruflich zu verändern. Er ernennt einen aufstrebenden jungen Angestellten zum Geschäftsführer und beteiligt ihn an der Firma. Gleichzeitig gründet er einen Investmentfonds und macht eine Weiterbildung im Bereich der Schweizer KMU Landschaft, um sich mit zusätzlichen produktiven Werten für den nächsten geplanten Schritt auszurüsten. Zahlreiche mittelständische Unternehmen in der Schweiz stehen kurz vor dem Ruin, weil sie mit den veränderten Marktbedingungen und der digitalen Disruption ihrer Geschäftsmodelle nicht mithalten können. Ebendiese Unternehmen kauft der Fonds auf, restrukturiert sie und macht sie wieder fit für den Markt. So manchem Schweizer Traditionsbetrieb kann dadurch geholfen werden.

2038 (48)

Die geleistete Arbeit in der Schweiz bleibt auch langjährigen Freunden in den USA nicht verborgen. Einer dieser Freunde, mittlerweile tätig für das Handelsministerium in Washington, kommt auf Urs zu und fragt ihn an, wieder in die Staaten zu ziehen und für die Regierung bei einer gross angelegten Initiative zur Stärkung der amerikanischen KMUs mitzuwirken. Urs, der die Zeit als Unternehmer zwar sehr genossen hat, aber nun an einer etwas ruhigeren Umgebung nichts auszusetzen hätte, nimmt nach Rücksprache mit der Familie die Stelle an und er, Ehefrau Sybille und die Kinder Alicia (13) und Sven (11) ziehen nach Washington und finden in der neuen Heimat schnell Anschluss. Rasch kann er sich in der neuen Umgebung vernetzen und seine immateriellen Werte weiter ausbauen.

2048 (58)

Beide Kinder (23 und 21 Jahre) sind mittlerweile am College und kommen, wenn überhaupt, nur noch übers Wochenende nach Hause. Ehefrau Sybille hat sich über die letzten Jahre neu orientiert und arbeitet in einer Führungsposition in einer grossen Hotelkette. Urs selber ist nach wie vor im Staatsdienst, wobei sich die von ihm mittlerweile angeführte Initiative prächtig entwickelt hat und von nun an auch ohne sein Zutun auskommen soll. Urs hat sich

von seiner Frau anstecken lassen. Zusammen entscheiden sie, ihr Wissen in der Gastronomie sowie seine Erfahrung in der Restrukturierung und im Coaching von Unternehmen auszunutzen und gemeinsam ein neues Projekt zu starten. Beide geben dazu ihren Job auf, um fortan als Berater um die Welt zu reisen, um angeschlagenen Hotels aus der Krise zu helfen und auch einfach mal etwas langsamer zu machen.

2058 (68)

Im Alter von 68 Jahren zieht es Urs und Sybille dann aber doch wieder zurück in die alte Heimat, in die Schweiz, in der mittlerweile auch die Tochter Alicia mit ihrem Mann und den drei Enkelkindern wohnt. Arbeiten müssten Urs und Sybille aufgrund ihrer materiellen Werte und der soliden Altersvorsorge nicht mehr. Urs fungiert aber weiterhin als Berater für Unternehmen aller Art, wenn auch in stark reduziertem Umfang. Eine Pensionierung von heute auf morgen lehnt er ab, weil ihm seine Tätigkeit nach wie vor Freude bereitet und er sich noch immer in der Lage fühlt, einen Mehrwert für seine Kunden zu bieten. Ansonsten versuchen sie möglichst viel Zeit mit ihren Enkelkindern zu verbringen sowie das gemeinsame Beziehungsnetzwerk zu pflegen. Dank altersgerechten Reiseangeboten reisen sie noch so oft wie möglich in die USA, um dort den Sohn mit seiner Familie sowie ihren Freundeskreis zu besuchen.

2075 (85)

Die Sonne ist es dann auch, die Urs und seine Frau zur letzten Veränderung in ihrem hundertjährigen Leben veranlasst. Im bereits fortgeschrittenen Alter von 85 Jahren ziehen die beiden in die Sonnenstube der Schweiz, das Tessin, wo sie fortan ihren Lebensabend in einer Einrichtung für betreutes Wohnen in den Rebbergen oberhalb von Ascona, mit Blick auf den Lago Maggiore, verbringen wollen. Sie haben in ihrem Leben viel erlebt und sind weit gereist, um am Ende aber doch wieder in der Heimat zur Ruhe zu kommen. Dank moderner Hilfsmittel stehen sie nach wie vor in regem Kontakt mit ihren Freunden und Bekannten auf der ganzen Welt und freuen sich trotzdem immer besonders, wenn jemand die Zeit findet, sie persönlich besuchen zu kommen.

3.3 Plan für die Altersvorsorge

Regula und Urs entscheiden sich beide, länger zu arbeiten und verringern so den Stress, genügend Geld in ihrer Pensionskasse für das Leben nach der Pensionierung zu sparen. Was ihre genauen Lebensersparnisse sind, ist schwierig zu sagen. Beide haben das Glück, einen Partner an ihrer Seite zu haben, der die Finanzen bei möglichen Neuausrichtungen

abfedert und mit dem sie die Kosten für Reisen, Familie und Wohnen teilen können. Was bei den Szenarien jedoch klar herauskommt ist, dass beide durch die stetige Veränderung und Selbstverwirklichung Spass an ihrer Tätigkeit haben und sie nicht mehr aufhören zu arbeiten, wenn es der Staat vorsagt, sondern wenn sie es selbst für richtig halten.

4. Agenda for Change

Gratton & Scott (2016, S.182 ff) teilen ihre Forderungen für zukünftige Änderungen in sechs Bereiche auf, welche in der Folge durchleuchtet und durch persönliche Meinungen angereichert werden sollen. Während die Themen Identität, Lebensplanung und Können auf das Individuum abzielen, rückt bei den Punkten Bildung, Unternehmen und Staat mehr das Umfeld ins Zentrum der gestellten Forderungen.

Identität

Sowohl die Theorie als auch die vorgestellten Profile von Regula und Urs haben verdeutlicht, dass das Leben der heranwachsenden Generationen eindeutig nicht mehr in den altgedienten 3-Stufen-Ansatz passen wird, sondern sehr viel mehr Veränderungen anfallen werden. Da man nur bedingt finanziell in immaterielle Werte investieren kann, ist es ausschlaggebend, dass die Individuen aktiv reflektieren und sich mit ihrer Umwelt auseinandersetzen. Diese Reflektion erschafft ein Bewusstsein, welches zukünftige Herausforderungen rationalisiert und die Individuen besser auf die sich ständig verändernde Zukunft vorbereitet.

Planung und Experimente

Eben weil die neuen Generationen nicht einfach ein Modell abkupfern können, ist eine gut durchdachte Planung des eigenen Lebens von grosser Bedeutung. Es sollte nicht einfach blind drauflos gelebt, sondern sich vertieft damit auseinandergesetzt werden, wie man sein Leben bestreiten will. Klar ist, dass dieser Prozess länger dauern wird als bei den vorangehenden Generationen und auch genügend Spielraum für Experimente eingebaut werden muss, um sein Selbst zu finden und einen Plan aufstellen zu können. Sowohl Regula als auch Urs machen in unseren Beispielen zudem immer wieder Standortbestimmungen, bei denen sie kritisch hinterfragen, ob die eingeschlagene Richtung noch stimmt oder ob sie Kursanpassungen vornehmen sollten.

Können

Im Rahmen stetiger Veränderungen wird das eigene Können, das heisst die Leistungsfähigkeit, Effizienz sowie Handlungsfähigkeit von enormer Bedeutung sein, da wir

in Zukunft noch viel häufiger Benchmarking Situationen ausgesetzt sein werden und uns stetig weiterentwickeln müssen. Dies betrifft selbstverständlich sowohl materielle als auch immaterielle Werte. Jemand der erfolgreich sein will, sollte stets seinen persönlichen Masterplan vor Augen haben und nichts unternehmen, was diesen gefährden könnte.

Bildung

Für die Bildung gibt es grundsätzlich eine gute Botschaft: Ein längeres Leben bedeutet auch einen grösseren Bedarf an Bildung. Daher ist es zu erwarten, dass unsere Bildungsinstitute signifikant wachsen werden. Neben einer längeren Orientierungsphase in einem frühen Stadium tragen dazu vor allem die Rückkehrer bei, die entweder nach einer Weiterbildung suchen oder sich komplett umorientieren möchten. So planen auch Regula und Urs, in ihrem Leben unterschiedlichste Aus- und Weiterbildungsangebote zu nutzen. Natürlich sind die veränderten Rahmenbedingungen auch mit einigen Herausforderungen für die Institute verbunden. So steht beispielsweise im Moment im Bildungssektor die digitale Disruption an, die mit komplett neuen, flexiblen Lehrmitteln und Lehrmethoden aufwartet, auf welche die jungen Generationen so schnell als möglich aufspringen wollen. Diese gilt es sinnvoll umzusetzen, um so bestmögliche Voraussetzungen für ein lebenslanges Lernen zu schaffen. Stand heute: Die Jahrgänge in einer Klasse oder einem Studiengang sind noch relativ nahe beisammen. Dies wird sich in Zukunft drastisch ändern, und es wird eine Herausforderung werden, generationsübergreifende Gebilde zu formen und allen Ansprüchen gerecht zu werden. Durch das steigende Bedürfnis für Weiterbildungen und Umschulungen wird auch das Bedürfnis nach Teilzeitweiterbildungen steigen, die mit dem Job vereinbar sind. Grundsätzlich wird von Bildungsinstituten ein massiver Anstieg der Flexibilität in der Bereitstellung der Inhalte und den Lehrmodellen gefordert werden. Die Unternehmen werfen den (Hoch-) Schulen heute zudem einen falschen Fokus vor. Ihrer Meinung nach fehlt im Studium ein erhöhter Fokus auf sogenannte Life Skills wie Kreativität, Innovation, Menschlichkeit und Empathie, anstelle von theoretischen Modellen und Konzepten. Die Bildungsinstitute werden einen wichtigen Beitrag zu einer erfolgreichen Gestaltung des 100-jährigen Lebens zu tragen haben, und es wird essentiell sein, dass sie diese Verantwortung auch wahrnehmen.

Unternehmen

Aber auch die Unternehmen, welche Forderungen an die Bildung stellen, müssen sich unverzüglich mit den anstehenden Veränderungen auseinandersetzen. Sie müssen die Interaktion mit den Angestellten umstellen. Es darf in Zukunft nicht mehr nur um materielle Werte gehen, sondern die immateriellen Werte müssen mindestens genauso beachtet

werden. Unternehmen müssen zudem Veränderungen und Transformationen von Mitarbeitern nicht nur zulassen, sondern vielmehr unterstützen, um damit deren transformationelles Skillset aufrecht zu erhalten. Die Zeiten, in denen man Mitarbeiter über die Dauer ihres Berufslebens in ein und derselben Position halten konnte, sind definitiv vorbei. Dementsprechend muss das Unternehmen die Karriereplanung für und mit den Angestellten überdenken und vom klassischen Modell abrücken. Eine immer wichtigere Rolle kommt der Familie im Berufsleben zu. Familie und Job verschmelzen zusehends und aufgrund dessen, dass oftmals beide Elternteile arbeiten. Aber auch weil beide Elternteile eine wichtige Rolle bei der Erziehung einnehmen, wird eine erhöhte Flexibilität seitens der Arbeitgeber nötig sein.

Staat

Der Staat spielt eine immens wichtige Rolle in der erfolgreichen Ausgestaltung des 100-jährigen Lebens, da er die Rahmenbedingungen schaffen muss, unter denen Erfolg möglich ist. Auch zum Staat ist zu sagen, dass er massiv hinter dem eigentlich benötigten Zeitplan hinterherhinkt. Dies kommt sicher davon, dass die Dringlichkeit der Affiche noch nicht ganz klar ist. So rechnet die Regierung momentan beispielsweise mit einer durchschnittlichen Lebenserwartung von 80-85 Jahren, wobei man in der Wissenschaft eigentlich von durchschnittlich über 100 Jahren ausgeht. Dies zeigt eines der Grundprobleme auf. Menschen fällt es schwer, andere Gegebenheiten anzunehmen als man sie selber für seine Generation vorgefunden hat. Daher fällt es auch extrem schwierig, langfristig für Generationen zu planen, die man selber wohl nie mehr erleben wird. Eine Massnahme, die unlängst getroffen wurde, ist die Erhöhung des Rentenalters. An sich eine notwendige Massnahme, aber alleinstehend nicht effektiv, wenn man sich zum Beispiel einmal die Arbeitslosigkeit in der Altersgruppe der 55 bis 64-Jährigen anschaut, welche sehr hoch ist. Ein weiteres Problem ist die Ungleichheit zwischen Arm-und-Reich, sowohl zwischen Ländern als auch zwischen verschiedenen Bevölkerungsschichten im gleichen Land. Momentan ist es oft so, dass nur die oberen Schichten die nötigen Veränderungen selbst finanzieren können, und dies sind oftmals genau die Gut-Ausgebildeten, bei denen der Bedarf im Vergleich nicht so akut ist. Angehörige niedrigerer Bevölkerungsschichten mit schlechterer Ausbildung aber, deren Jobs zum Beispiel akut durch die voranschreitende Automatisierung und Digitalisierung bedroht sind, haben oftmals kaum Möglichkeiten, sich zu verändern.

Nachfolgend werden die Erkenntnisse der vorliegenden Arbeit zusammengefasst und ein Ausblick auf weitere Forschungsfragen gegeben.

5.1. Zusammenfassung

Das 100-jährige Leben zu meistern, wird für die heutige Generation eine der grössten Herausforderungen. Alle Lebensbereiche werden sich an das 100-jährige Leben anpassen müssen, sei es das Arbeitsumfeld, private Beziehungen und Netzwerke oder wie die Generationen zusammenleben. Regula und Urs werden im Laufe ihres 100-jährigen Lebens durch mehrere Transitions-Phasen gehen, welche Flexibilität und Anpassungsfähigkeit erfordern. Die beiden werden deutlich länger als ihre Vorfahren im Erwerbsleben eingebunden sein und ihr Leben entsprechend anpassen. Ebenso müssen verschiedene Akteure wie die Regierungen oder Unternehmen pro-aktiv diesen Veränderungen entgegen-kommen, um den heutigen Lebensstandard aufrechtzuerhalten und weiterentwickeln zu können.

5.2. Selbstkritik / Beschränkungen

Die erstellten Profile von Regula und Urs basieren auf der eigenen Meinung sowie dem Bildungsstand der Verfasser und wurden in einer sehr verkürzten Version ausgearbeitet. Die Profile sind daher nicht als allgemeine Zukunftsvorhersage für die ganze Bevölkerung zu betrachten, sondern als mögliche Szenarien, die noch ausgebaut werden könnten. Zudem wurde bei beiden Profilen mit optimalen Voraussetzungen gearbeitet, und mögliche negative Faktoren wie beispielsweise Krankheit oder Scheidung sind bewusst ausgelassen worden. Auch der zeitliche Radius basiert auf Annahmen.

5.3. Ausblick auf weitere Forschungsfragen

Jedes der Themen, die bei der „Agenda for Change“ erwähnt worden sind, könnte einzeln analysiert werden. Fragen wie: „Lohnt sich das Sparen für die Rente noch oder wären stetige Arbeitseinnahmen nicht die bessere Alternative? Gibt es in Zukunft noch Altersheime oder werden diese durch die Altersdurchmischung obsolet? Welchen Einfluss haben flexible Arbeitsmodelle auf die Produktivität? Wie können die Leute auf eine spätere Pensionierung sensibilisiert werden? Wie müsste sich die Bildungslandschaft ändern, um den Kompetenzen der Zukunft gerecht zu werden?“, wären bloss eine kleine Auswahl an hochinteressanten Fragen für weitere Untersuchungen.

6. LITERATURVERZEICHNIS

Gratton, Lynda, & Scott, Andrew. (2016). The 100-year life. London: Bloomsbury Information.

Schläpfer-Uster, Jenny (31. Oktober 2016). Privates Telefonat.

Anruf Jenny VillageOffice, 31. Oktober 2016, 10 – 11 Uhr

Über Jenny und VillageOffice:

- BWL studiert, KMUs gearbeitet – sehr generalistisch. Über Lustprinzip Stellen gesucht. Ort und Produkt waren ihr sehr wichtig. Mutter von zwei kleinen Kindern. Vereinbarkeit Beruf und Familie. Mit 43 wurde grosses Thema, weiterhin berufstätig sein. Plötzlich kein Home-Office mehr möglich in ihrem alten Job (vor 3 Jahren).
- Eigene Eröffnung VillageOffice Genossenschaft in Wil. Fokus vor allem auf Startups. War noch ein Bedürfnis, dass man nicht kannte. Aller Anfangsphase des Umbruchs – Mobilität wurde gross in Frage gestellt. Hat nicht mehr den Platz auf der Schiene oder Strasse. Co-Working Spaces eröffnen in der Peripherie (Suburbs). Aber auch in den alpinen Regionen. Dass die Personen nicht mehr in die Zentren ziehen müssen und pendeln.

1. Was kommt auf Urs und Regula bezüglich Arbeit der Zukunft zu?

- Viele Indikatoren, dass es Auflockerung gibt. 20% von den Männern in ihrer Generation mit höherer Ausbildung möchten, dass Frauen weiterarbeiten. Doch noch oft traditionelle Rollen. 20% übernimmt ihr Mann die Woche die Kinder. Sie hat auch Teilzeitkarriere. Traditioneller Arbeitsalltag nur 50% verfügbar dafür am Abend auch verfügbar.
- Devices wären eigentlich vorhanden aber Problem momentan ist immer noch die Zeit erfassen, stempeln. Aber schwierig von der industriellen Revolution wegzukommen (Tradition), Vertrauensproblem. Dank der Digitalisierung muss man nicht mehr jeden Tag pendeln. Physisches Treffen immer noch wichtig, vielleicht ein Tag pro Woche. Wäre auch für Familie und Beruf ein grosser Vorteil.
- Das flexible Arbeiten – physische Ebene und man sieht sich virtuell, begibt sich trotzdem nicht ganz hinein. Co-Working - Vernetzung findet wieder auf menschlicher Ebene statt. Grundbedürfnis Arbeitsplatz mit Arbeitskollegen inklusive. Man ist nicht gezwungen sich auszutauschen. Man generiert sich gegenseitig Aufträge und erschafft Synergien. Persönliche Empfehlungsebene. Das funktioniert! In Zukunft wird dies noch viel mehr wachsen.
- Blogger, Programmierer, Journalisten sind immer noch voll im Geschehen aber arbeiten dort wo sie wollen. Arbeiten dort wo Leute in der Regel Ferien machen. Hat in der Schweiz riesiges Potenzial. Leute mit viel Geld kommen aus dem Ausland. Wir haben sehr viele leere Wohnungen, um Co-Working Spaces zu gründen. Laax, Verbier, etc. Leute können viel länger bleiben. Kinder haben zwei Wochen Ferien. Sie kann Teilzeit arbeiten im Co-Working Space. Flexibel gestaltbar. Man kann seinen eigenen Bedürfnissen nachgehen, kann selbst Tageszeiten bestimmen. Kunde bestimmt aber immer noch Abgabetermin. Beide Welten kombinieren können.
- Lebenszyklus von einem neuen Produkt, wird ähnlich sein mit den Spaces. Ist eine mentale Umstellung bis es selbstverständlich ist. Wird immer noch Leute geben, die traditionell und regelmässige Arbeit wollen. Kommt von industrieller Revolution - Fabriken sind immer noch ein Teil aber nicht mehr Usus. Z.B. Jeder hat ein Telefon Zuhause, aus Luxus ist Usus geworden ist. Mit der digitalen Welt wird dies in 10-20 Jahren Norm werden mit den Co-Working Spaces.

- Kann selbst seinen Beruf wählen, kein einziger pensioniert sich mit 65. Ihr Vater hat auch bis 75 gearbeitet, da es ihm Spass machte. Es hält einem auch geistig fit, damit im Geschehen bleibt und auch noch gebraucht wird. Dafür hat er sich seine Freiheiten genommen für die Hobbies. Tätigkeiten und Verantwortlichkeiten ändern, um auch Familie und Beruf zu vereinen. Früher war dies auch der Fall auf dem Hof. Jeder hatte seine Teilzeitaufgabe. Vielleicht werden es andere alten Leute als Grosselten, die auf die Kinder schauen. Es gibt immer mehr Projekte von Arealen mit Co-Working, Kinderort in der Nähe und auch mit Alterswohnungen. Dabei engagieren sich die älteren Leute in den Co-Working Spaces oder in der Kinderbetreuung. Zum Beispiel Schwiegervater hat eine grosse Werkstatt, und hätte Zeit sich zu engagieren und Sachen zu reparieren. Gegenseitiges profitieren, ältere Leute können den jüngeren Zeit geben dank der Digitalisierung. Co-Working Spaces zugänglich für jedermann – Kollaborationen.
- Think-Tanks eher theoretisch in einem Projekt aktivieren, dass in die Umsetzung gehen kann. Wenn Modell hier ist, dass die Leute in Zukunft auch so umsetzen werden. Auch schon Interesse im deutschen Raum. Auch New York, New Jersey. Problem vor allem mit ÖVs. In 10 Jahren sieht die Welt schon ganz anders aus. Schätzen Möglichkeiten des Reisens, Auslandaufenthalte zum Beispiel Unterengadin. Wenn man nur zweimal in der Woche nach Zürich muss.

2. Wie muss man sich Zukunft mit Smart Cities vorstellen?

- Impact Hub in Zürich in City – verschiedene Hubs und Clusters. Neue Marktplätze, Treffpunkte und Austauschplattformen. Anziehungsplattformen vor allem durch Experten. Dass man genau weiss, wo welche Kompetenzen zu finden sind.
- Clusters bilden, die auf Wissen beruhen und nicht auf Industrie. Aufgrund Textil St. Gallen ist Pharma in Basel entstanden – was hat man traditionell für Wissen?
- In St. Gallen noch mehr das vernetzte Wissen fördern und dies mit allen teilen (nicht nur Universität). Das Beste, egal von wo sie kommen. Siehe auch Smart Working CAS FHNW.

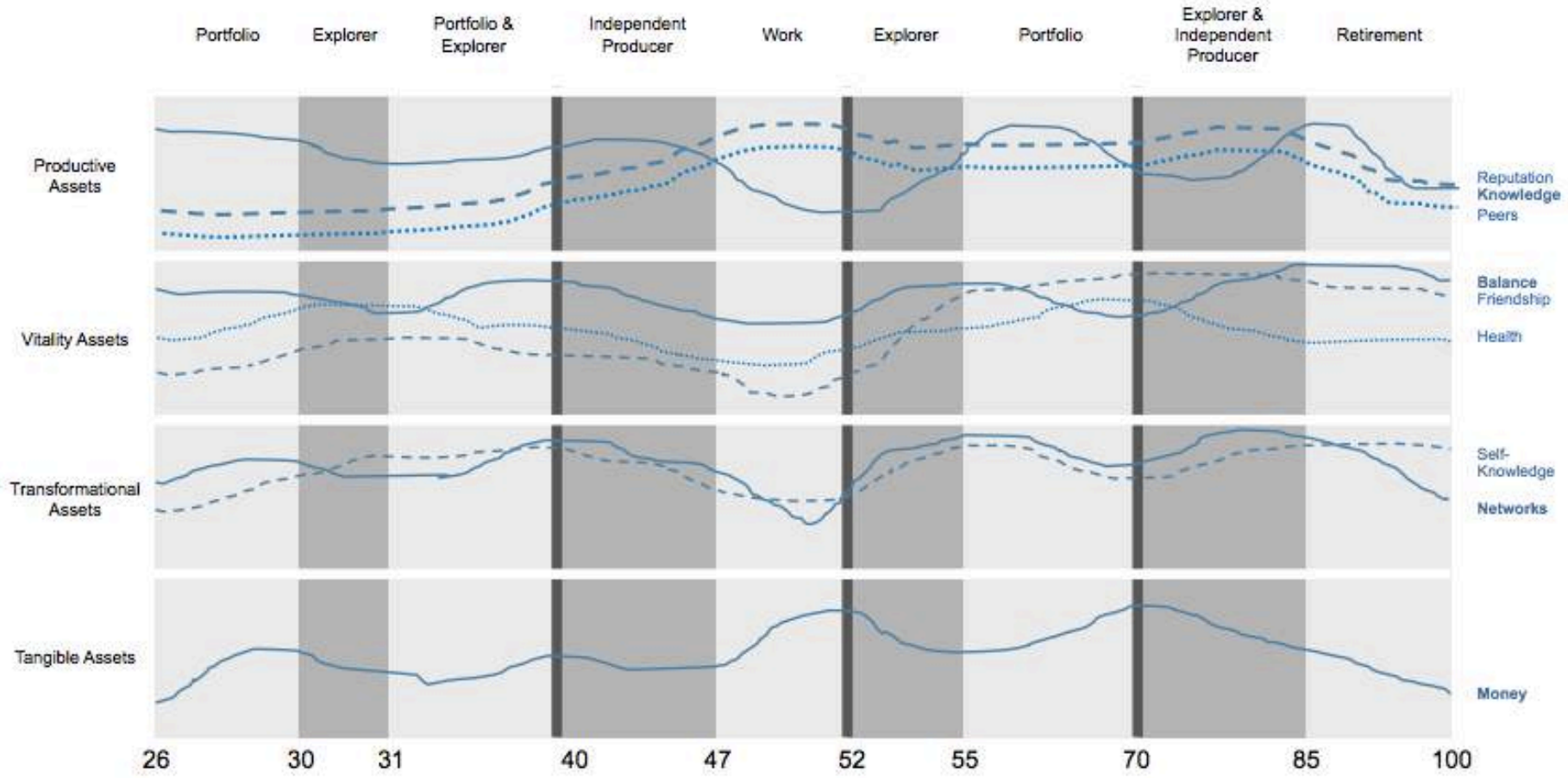
3. Welche Skills muss man vor allem beherrschen? Wie kann man sich auf den Wandel vorbereiten?

- Bildung meist nur ein Ansprechpartner, der Lehrer oder Coach ist. Informationen von verschiedenen Seiten holen. Austausch gibt Firmen und Schulen viel mehr Möglichkeiten sich zu vernetzen, sodass auch die akademische Seite profitieren kann. Ermöglicht einen ganz anderen Zugang zu Wissen.
- Digitale Lehrgänge ermöglichen sehr viel (auch finanziell). Es ist viel flexibler und erschafft auch die Möglichkeit jemandem eine Chance zu geben (bzgl. Sprache, z.B. Flüchtlingen).
- In der Zukunft benötigt sind Fähigkeiten die beratend sind, auf Ausnahmen oder auf Innovationen basieren oder Empathie mit sich bringen, um andere Leute damit abzuholen.
- Leitende Berufe werden nicht mehr auf Hierarchie beruhen. Eigenverantwortung wird wieder wichtig! Das ganze Self-Management wird der entscheidende Punkt! Zudem wissen wie vernetzen und wo die Leute zu finden sind.
- Kreativität in allen Bereichen ist gefragt.

4. In Zukunft viel mehr Flexibilität gefragt, wie können sich Unternehmen darauf vorbereiten?

- Sobald Grossfirmen umstellen, wird es schnell gehen. Wird ein Teil der heutigen Welt. Der Angestellte ist gezwungen, das zu machen was Arbeitgeber sagt, ist ziemlich eine lächerliche Überlegung. Selbstverantwortung geht verloren. Plötzlich eingesperrt und nicht mehr gefragt nach eigener strategischer Meinung.
- Die heutige Generation ist nicht mehr bereit dies zu tolerieren. Wie können sie trotzdem die besten Leute gewinnen? Wissensarbeitende, die flexibler arbeiten, ist die Zukunft. Siehe Studie McKinsey "The Gig Culture“: Man führt einen Auftrag aus, für den man spezialisiert ist. Dabei ist man viel mehr motiviert und hat Freude dabei.

Regula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Explorer & Independent Producer
Retirement
Productive Assets
Vitality Assets
Transformational Assets
Tangible Assets
Reputation
Knowledge
Peers
Balance
Friendship
Health
Self-Knowledge
Networks
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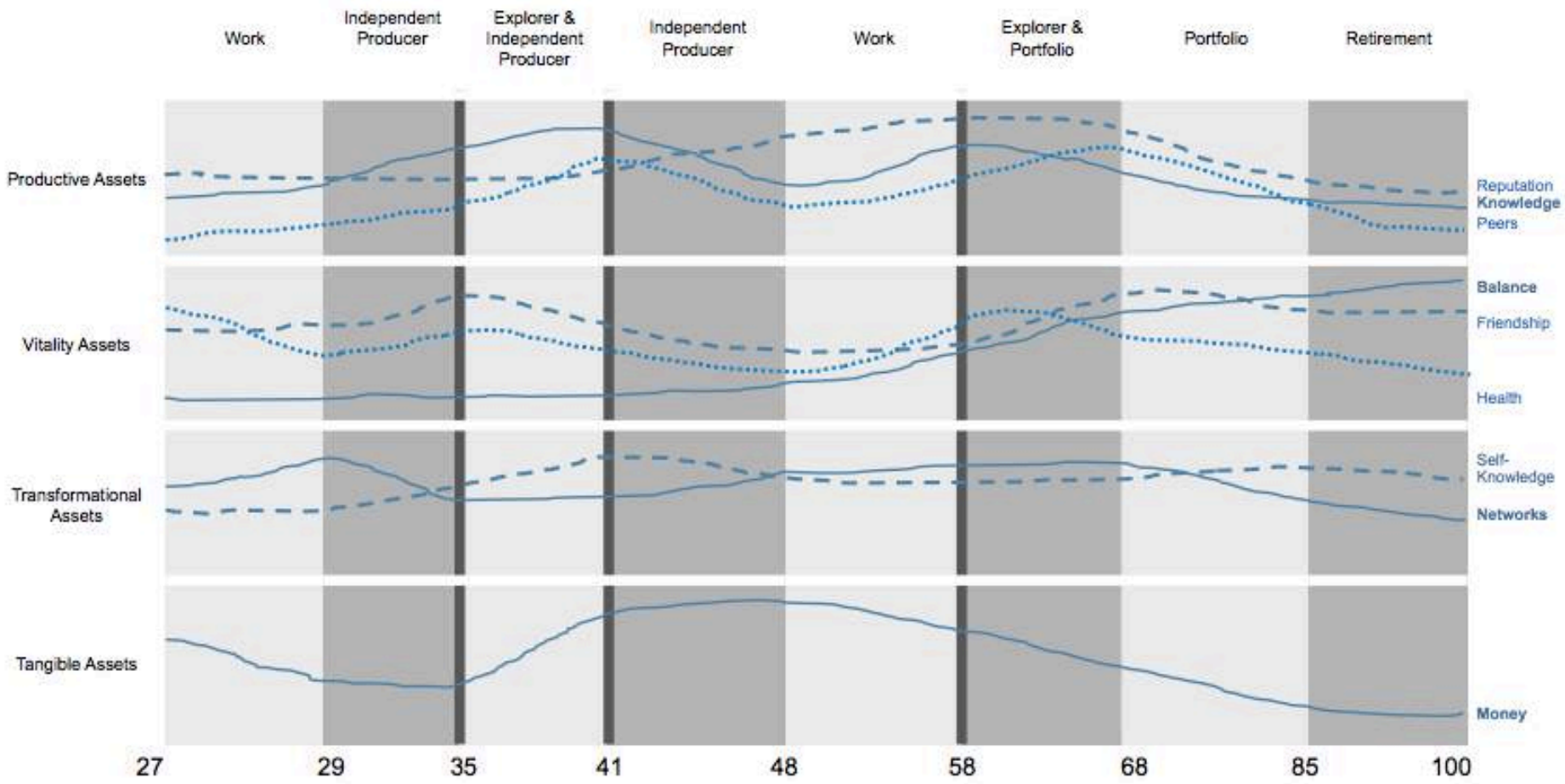
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Productive Assets
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Transformational Assets
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IV. NEW BOOK PUBLISHED BY THE LECTURER

Failure to address Africa's rising population is not an option

Africa will dominate global population growth in the 21st century. Almost 1bn people, or 13 per cent of the world's population, live in sub-Saharan Africa today. That number will more than double by 2050 and 4bn people (or 36 per cent of the world's population) could live in the region by 2100, according to a projection last month by the UN Population Division.

The main reason for the rapid growth is a sharp decline in infant and child mortality, with no associated reduction in birth rates. Today, sub-Saharan women have five children on average, compared with 6.7 in 1970.

Growing populations in the sub-Saharan region will influence societies, economic outcomes and geopolitics. In addition, the expected effects on food and water security (exacerbated by climate change) will be unprecedented.

These trends will impact not only the region but the rest of the world. Europe appears to be particularly vulnerable as migration from sub-Saharan Africa is likely to intensify in coming decades.

The good news is that African demographics appear to be commanding more international attention. The G20-Africa Partnership Conference, held in Berlin in June, focused specifically on Africa's population boom. The G20 Summit in Hamburg this weekend will also address Africa's population size and highlight the need for better employment opportunities.

Sub-Saharan Africa is at a crossroads regarding the potential to capture a demographic dividend — an economic surplus triggered by the decline in birth rates, a decrease in the number of young dependents and an increase in the proportion of working-age adults. But the pressing policy question is whether the region can replicate the conditions that enabled several East Asian countries to prosper from their own demographic dividends from the early 1960s to the 1990s.

For this to happen, public policies will need to manage a rapid and significant decline in fertility. To trigger such a sharp fall, countries must achieve a contraceptive revolution, in which more than 75 per cent of couples are using modern contraceptive methods. The current rate in sub-Saharan Africa is only 26 per cent.

The mere supply of family planning services will not be enough, however. Much more work is needed to promote the idea that smaller families are beneficial.

Policymakers and their development partners need to understand the implications of demographic dynamics and the crucial role of fertility reduction. Too many African policymakers, scholars, opinion leaders and business planners still believe that education and economic growth alone will trigger a fertility decline. As a result, African leaders remain diffident about intervening proactively in the debate.

In addition, Africa needs continued investment and improvement in its healthcare systems. The hope for fertility decline will depend on further improvements to women's rights, such as combating child marriage.

Making sure that women are able to access contraceptives is a priority. This month, the second London Family Planning Summit will rekindle international efforts to increase access to modern family planning for African women and girls.

Last but not least, Africans urgently need jobs. There will be no demographic dividend without job creation. According to the International Monetary Fund, between 18m and 20m new jobs — roughly equal to the population of Mali or Niger — will be needed annually over the next 25 years on the continent. If these trends are extrapolated until 2050, the new jobs required would be almost equivalent to the entire European population. The prerequisites to meet this huge challenge are education and better healthcare, followed by investment based on stable economic and political conditions.

The task ahead is formidable, not only for sub-Saharan Africa but also for the rest of the world. Failure is not an option: a bad outcome would harm both the region and the world. Failing to capture its demographic dividend would lead to millions of sub-Saharan Africans living in poverty and in slums. It would result in a restless young population and provoke social disruption and human suffering that could spill over well beyond the continent.

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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Hans Groth · John F. May *Editors*

Africa's Population: In Search of a Demographic Dividend

This book examines the promises as well as the challenges the demographic dividend brings to sub-Saharan Africa as fertility rates in the region fall and the labor force grows. It offers a detailed analysis of what conditions must be met in order for the region to take full economic advantage of ongoing population dynamics. As the book makes clear, the region will need to accelerate reforms to cope with its demographic transition, in particular the decline of fertility. The continent will need to foster human capital formation through renewed efforts in the areas of education, health, and employment. This will entail a true vision and determination on the part of African leaders and their development partners. The book will help readers to gain solid knowledge of the demographic trends and provide insights into socioeconomic policies that eventually might lead sub-Saharan Africa into a successful future.

« Africa needs a serious dialogue on population, the demographic transition, and the demographic dividend. This book with its comprehensive approach to the subject, makes an invaluable contribution. A must read for policymakers and development practitioners. »

Ngozi Okonjo-Iweala, former Finance Minister of Nigeria and former Managing Director of the World Bank Group.

« Everyone concerned about human welfare in sub-Saharan Africa should know about the demographic dividend, what it is, what causes it, and how to strengthen it. This volume provides an excellent summary of these crucial issues. The sooner policymakers pay attention and take the proper actions, the better. »

John Bongaarts, Vice President of the Population Council

« There is no more important socioeconomic issue for this century than that of whether Africa's currently rapid population growth turns out to be a dividend or a curse. As a comprehensive, up-to-date guide to the potential and the challenges, this book deserves to be widely read and debated. »

Bill Emmott, former Editor-in-Chief of The Economist, Chairman of the Wake Up Foundation

« This book is of utmost strategic relevance for any globally active company. For Africa in particular, the role of demographic change and the potential economic opportunities are all too often disregarded. »

Reto Francioni, Chairman SWISS International Airlines, former CEO Deutsche Börse

Social Sciences

ISBN 978-3-319-46887-7

New Book

Groth · May *Eds.*

Africa's Population: In Search of a Demographic Dividend

Hans Groth · John F. May *Editors*

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Springer