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The Modern Knowledge Economy in China and Europe:

Implications for Policy-Making

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ABSTRACT

Over the last 20 years knowledge has been of growing significance, hence, coining the term "knowledge economy". These past decades will prove to be of groundbreaking value for education and knowledge all around the globe. This thesis is aiming to discuss the challenges that the university systems in China and Europe face in the dawn of the knowledge economy. In order to get a proper understanding of the knowledge economy, the reader will first be introduced to relevant terminology. Next, an insight into the mathematic modelling in regards to the influence of higher education on economic growth is offered. Subsequently, the question of quality in higher education is introduced. The pertinence of rankings for yielding well-founded commensurability of universities is pointed out, before discussing the university systems of China and Europe, respectively. Thereupon, the issues of quality, equity, financing, and internationalization of higher education in China and Europe are raised. Furthermore, the resemblances of higher education in China and Europe are underlined by a number of tangible examples. To round off the results, various policy suggestions are proposed.

THANK YOU!

At this point, I would like to thank some important people who were a big help on the journey that culminated in this thesis. First of all, I want to thank my professor Dr. Hardy Hanappi for his help, his motivation, and his ideas, which encouraged me and kept me going. I want to thank my friends Maria and Lisa, who took the time to proofread this thesis, which I am aware, was not a small favor to ask.

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Finally, I want to mention all of the kids at Himalayan Helpless Child Academy in Kathmandu, Nepal. Spending five months with them made me realize the importance of education. That said they were one of the main reasons for my choice of topic.

Of course, there are many more people, who are not mentioned by name at this point, but whose support has been tremendously important for me. A general "Thank you!" goes out to all of you. You know who you are!

In the next 30 years, according to UNESCO, more people worldwide will be graduating through education than since the beginning of history. More people, and it's the combination of all the things we've talked about -- technology and its transformation effect on work, and demography and the huge explosion in population. Suddenly, degrees aren't worth anything. Isn't that true?

Robinson, K., 2006. How schools kill creativity. *TED2006*. February 26 2006.

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INTRODUCTION

Over the last 20 years knowledge has become a topic of growing significance. This ongoing development has led to the evolution of the knowledge economy. These past decades will prove to be of groundbreaking value for education and knowledge all around the globe.

The first chapter of this master thesis is devoted to emphasizing the magnitude of knowledge in today's world. Besides, it will familiarize the reader with basic terminology considering the knowledge economy. Apart from a general definition of knowledge the reader will also learn about knowledge intensity and how knowledge has been the object of the intensifying globalization. The globalization of knowledge has resulted in several difficulties for the global economy. The rise of competition of developing nations with the Western World in terms of knowledge has led to the emergence of a war of knowledge.

In Chapter 2 well-known mathematical models, like Solow's neo-classical model or Romer's endogenous growth approach, are introduced in order to illustrate the influence of education on economic growth. Apart from these traditional approaches, the reader will also find out about some new growth theories and empirical approaches.

Chapter 3 raises several questions about the quality of higher education and its impact on economic growth. At first, the meaning of quality in higher education is discussed. The reader will next learn about the future of higher education, necessary skills for the job market of the future, and how to raise the standards of educational quality. Learning environments and teaching practices that encourage knowledge absorption, and more specifically deep learning, are presented.

The next chapter deals with the question of comparability of universities across the globe. The growing importance of rankings will be discussed and reasons for the necessity of rankings will be given. As with any rapid development, there are downsides to the recently emerging trend of labelling universities. These aspects will be discussed at the end of this chapter.

Chapter 5 is focusing on the situation of higher education in China. It aims to point out

why knowledge economy is important for modern-day China. In order to get a complete picture of higher education in China, the strengths and weaknesses of the Chinese university system will be introduced in the course of this chapter. To fully understand the peculiarity of China's university system it is necessary to illustrate the reforms of the system that have been put into place since the late 1990s. The fast rise of students enrolling at universities along with China playing a leading role as producer of science graduates are only some of the changes these policies have caused. The last section of this chapter focuses on the repercussions of the reforms of China's higher education policies across the Chinese borders.

In discussing higher education in Europe the sixth chapter forms the counterpart to Chapter 5. The reader will learn about the significance of education for the European economy. The role of universities in securing Europe's competitiveness in the global market of the 21st century will be discussed next. Further, funding and autonomy will be introduced as the two key factors for a successful university system. Finally, suggestions for possible reforms of Europe's university system will be given. These reforms include supporting the aforementioned key factors of finance and autonomy, as well as an increase in competition among universities.

In Chapters 7 and 8 challenges for the higher education systems of China and Europe are presented, respectively. Current policies tackling these challenges are introduced. In the course of these two chapters the reader will learn more about issues like quality, equity, resources, and internationalization of higher education in China and Europe. In order to guarantee better understanding of these issues, the reader is provided with tangible examples.

Chapter 9 offers a juxtaposition of policies in Europe and China. In the course of this chapter it is pointed out that in both cases the high segregation and independence of local governments pose certain risks. When comparing policies of China and the EU it becomes quite clear that both economies are struggling with regional disparities. Chinese Push- and Pull-Side policies are introduced to illustrate China's attempts to connect academics with businesses. Analogously, Europe has put innovation policies into place. At the end of this chapter the importance of human resources and its reverberations for higher education in China and the EU will be debated.

The last Chapter of this thesis aims at closing the circle. It gives instructions for possible policy developments for China and Europe, especially considering the topics of quality, equity, resources, and internationalization that have been covered in greater detail in the previous chapters. It explains why policy proposals can be a delicate issue and how to overcome some obstacles in the course of reforming policies in higher education. Finally, the most important statements are summarized, offering the reader a conclusive recapitulation of the Chinese and European university systems.

1. THE GLOBAL KNOWLEDGE ECONOMY

In the last decades an essential economic development could be witnessed all over the world. Scholars like to call it the "the global knowledge economy". The time between the mid-1980s and the early 2020s will stand out in human history as an essential period for education. It can be compared to the time between the 1760s and the 1820s. The outcome of this economic development is similar in importance to the Industrial Revolution, since it too will prove to be of great significance for the global society. (Sheehan, 1999: 1)

Barber, Donnelly and Rizvi (2013: 4) even go so far as to say that

> [t]he models of higher education that marched triumphantly across the globe in the second half of the 20th century are broken. Just as globalisation and technology have transformed other huge sectors of the economy in the past 20 years, in the next 20 years universities face transformation.

1.1. WHAT IS KNOWLEDGE?

In modern economies knowledge is of rising value in private and public life. Knowledge cannot be compared to other goods. According to Sheehan (1999: 14) knowledge is a unique good, since it is

> non-rival and to some degree non-excludable; it has fixed costs in its production and gives rise to increasing returns, and the development of knowledge is inherently uncertain. The prevalence of knowledge in economic affairs plays havoc with traditional neo-classical economic models, and renders the analysis and policy prescriptions arising from such models of uncertain validity.

1.2. KNOWLEDGE INTENSITY

The global knowledge economy has evolved out of an increasing importance of knowledge across various economic sectors. In the modern world knowledge holds an essential place in goods and services. (Sheehan, 1999: 4)

Innovation is promoted by highly skilled workers especially in high-technology sectors, but also beyond. Research shows that the production of innovative goods is closely linked to jobs that require well-educated workers. Knowledge-intensive activities are

defined by the European Commission "as those activities where at least 25% of the workforce has a tertiary education". Keeping this definition in mind one can find knowledge intensity not only in manufacture, but also in services and other sectors. (2011: 38-40)

Consider knowledge intensive goods like aircrafts, drugs, computers etc. They may be made up of simple parts, but the combination of them into the final product requires a vast amount of knowledge. An ever growing number of such knowledge intensive products are part of our everyday lives. (Sheehan, 1999: 4)

1.3. THE GLOBALIZATION OF KNOWLEDGE

"Globalization is the context of economic and academic trends that are part of the reality of the 21st century." (Altbach and Knight, 2007: 290)

This quote makes globalization seem like a fairly new phenomenon. Sheehan (1999: 6) argues further that globalization has moved at a rapid pace over the course of the last decades.

Leftly (2013: 3) reminds the reader that universities have been leading forces of globalization long before the 21st century. For many centuries students and faculty have been discoursing about their ideas, hence, encouraging progress across nations. In this leading role universities have long-since shaped our current perception of globalization. Unlike in the past, when students for the most part swapped ideas amongst each other, lately there has been an increase of interaction with industries as well as governments. This collaboration fuels the economy as a whole.

However, some critics like Barber, Donnelly and Rizvi (2013) argue that certain governments seem to have forgotten the global background of universities and treat their university systems as national as opposed to global concerns. (Leftly, 2013: 29)

The growing importance of knowledge all around the globe has led to the development of the phenomena of brain drain, brain exchange, and brain circulation. The first term, brain drain, refers to the movement of knowledge from one place to another. The second term, brain exchange, stands for a movement between two places that is occurring in both directions. The last term, brain circulation, describes the phenomenon of people

going abroad for their studies, and possibly even finding work there. Eventually they move back to their home countries, having attained knowledge which will be valuable for them in finding work at home. (Huang and Soete, 2007: 13)

Globalization gives people all around the world the incentive to get better education. People are aiming to increase their own worth so as to be able to move to places with prospects of higher earnings. The case of China has shown that exporting countries can be profiting from the fact that their students are studying abroad. When a large number of people are aspiring to acquire higher education and then leave their home countries, the population staying behind is inclined to obtain higher education as well. Eventually, some of the students who once left their home countries return, resulting in the desirable phenomenon of brain circulation. At the other end receiving countries crave for the immigration of highly skilled workers. They support an upswing of the economy and bring about additional advantages. These advantages include a growing demand for goods as well as for services, and the allurement of financial assets. Furthermore, moving to a new country can encourage migrants to take chances and start new businesses. (Huang and Soete, 2007: 13-14)

1.4. RACING TOWARDS A HIGHLY SKILLED ECONOMY

The significance of highly skilled economies has been acknowledged as a current worldwide development. Governments are shifting their focus towards higher education in order to create a well-trained labor force. It can be observed that lately a growing number of students have enrolled at universities around the globe. People have started to realize that the key to being successful in today's economy lies in a good educational background. This can mean university training but also "life-long learning". (Brown, Lauder and Ashton, 2008: 2)

The desire for a well-educated workforce can be found all around the world. Multinational corporations have found value in a cheaper, well-educated workforce from emerging economies, like China and India. This leaves university graduates from developed countries with worsening employment opportunities. Brown, Lauder and Ashton talk about the "global skills race", discussing the growing role of training and know-how in today's world. Assuming that developed countries have realized that the motor of an economically successful future lies in the improvement of their workforce's

education, they are on their way to becoming knowledge economies. As the race continues it is their task to outwit the rest of the world. (2008: 4)

When back in the last century people in Western economies could rely on manufacturing jobs without special training, this situation has changed dramatically in the recent past. An increasing number of low-skill jobs have moved over to Eastern European and Asian countries. Even more recently, the Chinese and Indian markets have brought up highly sophisticated technological products themselves. This has caused developed countries to re-assess the importance of countries like China and India as highly skilled economies. (Brown, Lauder and Ashton, 2008: 4)

Be that as it may, China and India did have an important advantage compared to their Western counterparts. While it took the powers of the West centuries to develop their knowledge economies, China and India managed to catch up quickly. They already had the findings of the West to rely upon for a faster development. Furthermore, the advance of cell-phones and other forms of new media permitted them to spur their pace. (Brown, Lauder and Ashton, 2008: 7)

Brown, Lauder and Ashton argue that seemingly economies like China and India are no longer willing to perform the physical labor of the world's economy anymore, while Western Knowledge Powers like Germany, Japan, and the United States are pulling the strings in the background. The Western World would be naïve to think China and India are only investing into higher education to bait multinational corporations (MNCs). Indeed they are wisely using their newly built human capital stocks in order to boost their economies. They do this with a pinch of high-tech infrastructure, which will in the end help them build a range of successful MNCs of their own. (2008: 6)

The following quote about the "global skills race" by former British Prime Minister Gordon Brown (2008 cited in Brown, Lauder and Ashton, 2008: 4) will emphasize the significance of this current development.

> Already our Asian rivals are competing not just in low-skilled manufacturing, but in high-tech products and services. Once, we worried about a global arms race. The challenge [in] this century is a global skills race and that is why we need to push ahead faster with our reforms to extend education opportunities for all…In a globally competitive national economy, there will be almost no limits to aspirations for upward mobility. Globalisation dictates that the

nations that succeed will be those that bring out the best in people and their potential. And this is the new opportunity for Britain. Put simply: in the past, we unlocked only some of the talents of some of the people; the challenge now is to unlock all the talents of all of the people.

1.5. EMERGING AND DEVELOPING ECONOMIES CATCHING ON

Obviously, there has been a shift of wealth away from the classic economic powers of the West. There was a time when political as well as economic power lay in the hands of big players like the United States or Europe. Times have changed and the old superpowers have to yield some of their authority to emerging economies in Asia, as well as to those in Central and South America. With rapidly rising numbers of population consumption in Asia and Latin America is expanding. Therefore, these parts of the world are of growing economic interest. Similar power shifts can be observed in university systems. (Leftly, 2013: 10)

With the concept of the knowledge economy spreading around the world, enrollment in higher education institutions has been on the rise. With all the economic benefits of an expansion of higher education, OECD countries have been experiencing growth. Canada was among the first economies to record that over half of its population between the ages of 25 and 34 with higher degrees set foot in the working world. (Brown, Lauder and Ashton, 2008: 6)

Nonetheless, developing countries have meanwhile managed to jump aboard the education train. Brown, Lauder and Ashton mention that in the course of a decade, university enrollments have doubled globally, with almost 63 million enrollments by 2005. More university enrollments obviously result in a greater supply of highly skilled workers with comparable degrees of knowledge all around the world. (2008: 6)

Speaking in absolute figures, the number of university students in China is larger than the respective number for the United States. In the years to come the divergence between these numbers is expected to keep expanding. A similar development has been occurring in India since the 1990s. In the natural sciences and in engineering subjects this trend becomes particularly obvious. The number of recently graduated Asian engineers is double the number of American and European engineers combined. On top of that, almost half of the students with a doctoral degree in computer sciences,

mathematics, and engineering in the US are foreigners. Above all this one must not forget that it can be very risky to draw unambiguous conclusions about the quality of education based on absolute numbers of enrollment et cetera. (Brown, Lauder and Ashton, 2008: 6)

2. MATHEMATIC MODELS OF THE IMPACT OF EDUCATION ON ECONOMIC GROWTH

2.1. GROWTH ACCOUNTING AND NEO-CLASSICAL MODELLING

Benchmarking economic outputs across nations was one of the pivotal reasons for researchers wanting to find out exactly how much of an impact education and skills have on the economy. As a matter of fact, the significance of human capital has increasingly been appreciated. In macroeconomics the two most common approaches to measure the impact of human capital on economic growth are neo-classical growth models, such as augmented Solow models (Solow, 1957) and endogenous growth models, with Romer (1986) probably being the most widely known advocate. (Wilson and Briscoe, 2004: 37)

On the one hand, neo-classical models suggest a one-to-one relationship of growth in productivity and expansion of human capital. On the other hand, endogenous growth theory argues that a "one-off" expansion of human capital can trigger long-term growth in productivity. Needless to say, both of these approaches yield comparable outcomes in the short term, i.e. under similar conditions. In any case, in view of long-term developments, newer growth models suggest a considerably higher influence of human capital on economic outcomes. Regardless, research has widely come to the conclusion that "higher educational inputs increase productivity and so produce higher levels of national growth", even when turning a blind eye on the specifics of the model. (Wilson and Briscoe, 2004: 37)

The results stemming from these models suggest a strong relationship between funding human capital - especially education - and economic growth. Research conducted by the OECD supports this claim. Popular arguments by supporters of this theory include that higher degrees of education are related to higher degrees of health, social solidity, and improved living situations. All of these factors are subsequently responsible for speeding up economic growth. (Wilson and Briscoe, 2004: 38)

2.1.1. THE GROWTH ACCOUNTING APPROACH

Growth accounting shares many similarities with basic research considering returns to education. Nonetheless, it puts much weight on macroeconomic concerns. In other

words, it considers the impact of education and training as observed from increased outputs and sales, as opposed to wages. As early as in 1957 Solow laid the foundations for models of growth accounting. Essentially, Cobb-Douglas production functions build the core of such models. Consider the following model. (Wilson and Briscoe, 2004: 38)

$$Y_t \ = \ A_t \, K_t^a \, L_t^b \, M_t^c \tag{2.1}$$

In the equation above Y denotes gross output, including yield from sales. Further, K stands for the physical capital stock, while L denotes labor, and lastly M represents materials as well as other transitional inputs. A_t is used as a measure of productivity. That is to say, for any arbitrary but fixed amounts of input, a higher A_t implies an increase in outputs. Since A_t is dependent on the measuring module of the inputs, the equation from above needs to be differentiated with respect to time in order to avoid any problems in compatibility. As a result, one obtains following equation. (Wilson and Briscoe, 2004: 38)

$$\Delta Y_t = \Delta A_t + a \, \Delta K_t + b \, \Delta L_t + c \, \Delta M_t \tag{2.2}$$

Obviously, Δ denotes the rate of growth of the respective item. Subsequently, when rearranging equation (2.2) from above into the following equation (2.3), one can conclude that ΔA_t is "the rate of change in total factor productivity". Put differently, ΔA_t can be interpreted as the change in output which is not explicable by changes of tangible inputs. (Wilson and Briscoe, 2004: 38)

$$\Delta A_t = \Delta Y_t - a \, \Delta K_t - b \, \Delta L_t - c \, \Delta M_t \tag{2.3}$$

As a result of its properties A_t has become known as the residual factor. Originally, Solow (1957) concluded in his study that this factor was responsible for more than 85% of changes in output. (Wilson and Briscoe, 2004: 38)

2.1.2. THE SOLOW-SWAN MODEL – A NEO-CLASSICAL APPROACH

Growth accounting models like the one illustrated above are a very helpful tool in describing the relationship of human capital and economic growth. Of course, the big disadvantage of these models is that their basic assumptions pose high limitations. Research has proven that an additional variable needs to be introduced to a production

function in order to reinforce the significance that education has on growth. Solow (1957) became something of a pioneer with incorporating a factor for the impact of education in his neo-classical model. Considering the influence of Solow's findings it seems only sensible to provide an overview of the Solow model at this point. In the form of extensions of the basic model, the reader will repeatedly come across the Solow model in the further course of this thesis. (Wilson and Briscoe, 2004: 39)

Barro and Sala-i-Martin (1995: 16) introduce the neo-classical production function. They start with a production function of the form

$$Y = F(K, L) \tag{2.4}$$

Such a production function needs to fulfill following three properties in order to be classified as neo-classical. (Barro and Sala-i-Martin, 1995: 16)

First of all, returns to scale must be constant, i.e.

$$F(\lambda K, \lambda L) = \lambda \cdot F(K, L) \text{ for all } \lambda > 0 \tag{2.5}$$

Secondly, for all $L > 0$ and $K > 0$ marginal products are positive and decreasing for L and K respectively, i.e.

$$\frac{\partial F}{\partial L} > 0, \quad \frac{\partial^2 F}{\partial L^2} < 0 \tag{2.6a}$$

$$\frac{\partial F}{\partial K} > 0, \quad \frac{\partial^2 F}{\partial K^2} < 0 \tag{2.6b}$$

The third set of requirements is commonly referred to as the Inada conditions. On the one hand, these conditions imply that as labor approaches infinity its marginal product goes to zero. On the other hand, with labor approaching zero its marginal product goes to infinity. The same assumption holds true for capital and its marginal product, i.e.

$$\lim_{L \to \infty}(F_L) = \lim_{K \to \infty}(F_K) = 0 \tag{2.7a}$$

$$\lim_{L \to 0}(F_L) = \lim_{K \to 0}(F_K) = \infty \tag{2.7b}$$

Barro and Sala-i-Martin (1995: 16-17) clarify that the first assumption of constant returns to scale allows a transformation of the output;

$$Y = F(K, L) = L \cdot F\left(\frac{K}{L}, 1\right) = L \cdot f(k) \tag{2.8}$$

Here, k denotes the ratio of capital to labor $\frac{K}{L}$ and y stands for per capita output, i.e. $\frac{Y}{L}$. The function $f(k)$ is equal to $F(k, 1)$. According to these definitions, one obtains the intensive form of the production function, which is defined as (Barro and Sala-i-Martin, 1995: 17)

$$y = f(k) \tag{2.9}$$

In the next step Barro and Sala-i-Martin (1995: 17) differentiate the equation $Y = L \cdot f(k)$ with respect to K, while assuming L at a constant level. They repeat this for L analogously, resulting in following marginal products

$$\frac{\partial Y}{\partial K} = f'(k) \text{ and} \tag{2.10a}$$

$$\frac{\partial Y}{\partial L} = [f(k) - k \cdot f'(k)] \tag{2.10b}$$

Taking this notation and applying it to the Inada conditions from above culminates in $\lim_{k \to 0}[f'(k)] = \infty$ and synonymously in $\lim_{k \to \infty}[f'(k)] = 0$.

By acknowledging the validity of the neo-classical conditions (2.5) to (2.7b), both input factors K and L are imperative for production, i.e. $F(0, L) = F(K, 0) = f(0) = 0$. Furthermore, this results in the conclusion that the output Y approaches infinity as at least one of the input factors K or L nears infinity. (Barro and Sala-i-Martin, 1995: 17)

For simplicity the Cobb-Douglas function is often used to describe the economy. With a general notation of $Y = AK^\alpha L^{1-\alpha}$, where $A > 0$ denotes the degree of technology and a constant value for $\alpha, 0 < \alpha < 1$. As a consequence, the intensive form of the Cobb-Douglas production function is $y = Ak^\alpha$. (Barro and Sala-i-Martin, 1995: 17)

Since $f'(k) = A\alpha k^{\alpha-1} > 0$, $f''(k) = -A\alpha(1-\alpha)k^{\alpha-2} < 0$, $\lim_{k \to \infty} f'(k) = 0$ and $\lim_{k \to 0} f'(k) = \infty$, the Cobb-Douglas production function fulfills all of the presumptions for a neo-classical production function. (Barro and Sala-i-Martin, 1995: 17)

In the further course, Barro and Sala-i-Martin (1995: 15, 17) present the economy's

changes that can be derived from the neo-classical production function. Assuming the dynamics in capital are defined as

$$\dot{K} = I - \delta K = s \cdot F(K, L, t) - \delta K \qquad (2.11)$$

In this equation, $\dot{K}$ represents the differentiation of capital over time. s denotes the saving rate, i.e. the amount of output that is invested into saving, with $0 \leq s \leq 1$. The rate of depreciation is presumed to be given by a constant value of $\delta > 0$. Taken all of this into consideration, one obtains equation (2.11), which yields the changes of K with respect to given values of labor and technology. In the Solow-Swan model that is represented here, technological progress is ignored, i.e. $F(\cdot)$ does not depend on t.

Next, each side of (2.11) is divided by L, which results in

$$\dot{K}/L = s \cdot f(k) - \delta k \qquad (2.12)$$

While all the factors on the right side of (2.12) are given per capita, this is not true for the left side. Even so, it is possible to transform the left side accordingly, so as to acquire a term of the same form as on the right side. As a result, applying

$$\dot{k} \equiv \frac{d\left(\frac{K}{L}\right)}{dt} = \dot{K}/L - nk \qquad (2.13)$$

to (2.12), with $n = \dot{L}/L$, ultimately results in

$$\dot{k} = s \cdot f(k) - (n + \delta) \cdot k \qquad (2.14)$$

This non-linear equation, which is only dependent on k, makes up the core part of the Solow-Swan model. (Barro and Sala-i-Martin, 1995: 17-18)

Figure 1 portrays the production function, $f(k)$, which obviously stands in proportion to the curve for gross investment, $s \cdot f(k)$. The vertical difference between $s \cdot f(k)$ and $s \cdot f(k)$, which is defined as c stands for per capita consumption. The straight line, $(n + \delta) \cdot k$, that starts in the origin, is the effective depreciation for k. An alteration of k can be depicted from the vertical difference between $s \cdot f(k)$ and $(n + \delta) \cdot k$. Finally, k^*, which denotes the steady state level of capital, can be found at the intersection of the depreciation line, $(n + \delta) \cdot k$, and the gross investment curve, $s \cdot f(k)$. (Barro and Sala-i-

Martin, 1995: 18)

Figure 1: The Solow-Swan Model
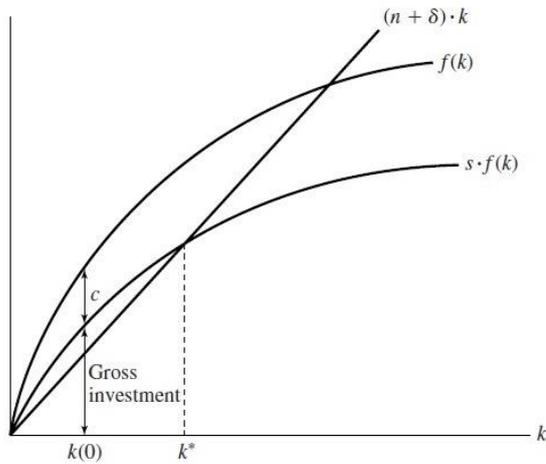
Source: Barro and Sala-i-Martin (2004, Figure 1.1: 29).

To get a better idea of the Solow-Swan model, Barro and Sala-i-Martin (1995: 19) consider the steady state. Typically, the steady state level is reached when the inputs increase constantly. In the neo-classical model that is being discussed this means $\dot{k} = 0$ for (2.14). In the graphical solution from above that would be the point of intersection between the $(n + \delta) \cdot k$ and $s \cdot f(k)$ curves. Proceed on the assumption that $k > 0$, i.e. disregard the case of $k = 0$, then the value of k at the interception between these two lines is defined as k^*. Transforming (2.14) under the condition that $\dot{k} = 0$ results in the algebraic solution of the problem as

$$s \cdot f(k^*) = (n + \delta) \cdot k^* \tag{2.15}$$

A constant value of k in the steady state implies that c and y are at fixed levels as well. Their optimal values are given as $c^* = (1 - s) \cdot f(k^*)$ and $y^* = f(k^*)$ respectively. In consequence, the Solow-Swan model suggests that k, c, and y do not increase at the steady state level. Since these variables are defined as per capita quantities, their respective levels of K, C, and Y increase in the steady state by the population's growth rate n. (Barro and Sala-i-Martin, 1995: 19)

Barro and Sala-i-Martin (1995: 19) describe that developments of the level of technology can be depicted by various means. These include shifting the production

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function $f(\cdot)$, changes of the population's growth rate n, of the savings rate s, and of the rate of depreciation δ. Still, one must not forget that each of these changes affects the per capita levels of the variables in the steady state. Reconsidering the graphical solution from above, shifting the production function upward or a higher s implies that the $s \cdot f(k)$ curve is object to an upward shift as well. This further implies higher value of k^*. If, however, n or δ are increased, the $(n + \delta) \cdot k$ curve is shifted upwards and, consequently, the optimal value of k^* is lower.

Even so, one must not forget that the steady state rates of growth of capital, per capita output, as well as consumption, which are all 0, do not depend on alterations of the degree of technology, population growth or the savings rate. Subsequently, the Solow-Swan model as has been described thus far does not offer answers concerning the triggers for long-term growth per capita. (Barro and Sala-i-Martin, 1995: 19)

According to Barro and Sala-i-Martin (1995: 19), with a given production function, as well as given n and δ, one acquires a particular $k^* > 0$ depending on the respective savings rate s. This correlation can be written as $k^*(s)$, where $dk^*(s)/ds > 0$. As was mentioned above, in the steady state there is an optimal value of per capita consumption, which is now defined as $c^* = (1 - s) \cdot f[k^*(s)]$. By using (2.15) it is quite simple to derive following equation in order to obtain c^*.

$$c^*(s) = f[k^*(s)] - (n + \delta) \cdot k^*(s) \tag{2.16}$$

Figure 2: The Golden Rule of Capital Accumulation
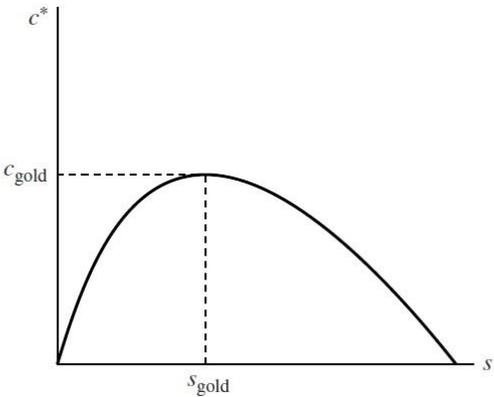
Source: Barro and Sala-i-Martin (2004, Figure 1.2: 35).

In Figure 2 the dependence between the saving rate s and the per capita consumption c^* in the steady state is graphically illustrated. As is underlined with Figure 2, the "Golden Rule" renders the saving rate s_{gold}, which marks the saving rate maximizing per capita consumption in the steady state. (Barro and Sala-i-Martin, 1995: 20)

According to Barro and Sala-i-Martin (1995: 20), it can easily be depicted that for low amounts of s the c^* is growing, while c^* diminishes for high levels of s. The maximum quantity of c^* is reached as $[f'(k^*) - (n + \delta)] \cdot \frac{dk^*}{ds} = 0$. i.e. as the derivative dissolves. Obviously, since $\frac{dk^*}{ds} > 0$ the derivative dissolves if and only if $[f'(k^*) - (n + \delta)] = 0$. Defining k_{gold} as the amount of k^*, that is reached in the maximum of c^*, results in the equation

$$f'(k_{gold}) = n + \delta \tag{2.17}$$

Ultimately, the respective savings rate is given by s_{gold}, while the corresponding per capita consumption in the steady state can be defined as $c_{gold} = f(k_{gold}) - (n + \delta) \cdot k_{gold}$. (2.17) is generally referred to as the "golden rule of capital accumulation". The economic interpretation of the golden rule is given by Barro and Sala-i-Martin as "if we provide the same amount of consumption to members of each current and future generation – that is, if we do not provide less to future generations than to ourselves – then the maximum amount of per capita consumption is c_{gold}."(1995: 20)

2.1.3. THE NEO-CLASSICAL PRODUCTION FUNCTION

Solow (1957) applied subtle changes to the Cobb-Douglas production function that was introduced in (2.1). Once more, the equation portrays the relationship between input and output. (Wilson and Briscoe, 2004: 39)

$$Y_t = Ae^{gt}K_t^a L_t^b M_t^c \tag{2.18}$$

Analogously to (2.1), Y stands for gross output, K denotes physical capital, L is labor stock, and M again stands for materials as well as other transitional inputs. One must not forget that all of the variables can either be in volume or real values. Accordingly, equation (2.18) suggests a technical dependence between input and output. One can

easily depict the connection with the previously introduced growth accounting model, for (2.18) shows very high similarities to (2.1). As a matter of fact, there are only two big distinctions between these two models. (Wilson and Briscoe, 2004: 39-40)

The first difference, which is quite eye-catching, is the introduction of the term e^{gt}. This term is used in order to explain changes caused by technological progress. Obviously, one can conclude that it is an exponential time trend as part of time series estimation. The other difference is that in this case the estimation of the equation is performed through regression, as opposed to establishing accounting measures. Again, $a, b,$ and c denote factor shares. (Wilson and Briscoe, 2004: 40)

In order to receive close results to those of growth accounting models of the second generation, the capital K can be broken down into different classes, $K_{1t}^{a1}, \dots, K_{nt}^{an}$. Analogously, one can differentiate between various kinds of labor; depending on ability, experience, profession, and so on. In the model below, H has been introduced as a vector of measures. In this way, the diversity of the variables is taken into account, while at the same time their homogeneity will not be lost. To be precise H represents the alterations in input quality. Additionally, it gives a weighted average of education and abilities. (Wilson and Briscoe, 2004: 40)

$$Y_t = A \, K_t^a \, L_t^b \, M_t^c \, H_t^d \tag{2.19}$$

This model allows for a rather sensible crossover to knowledge production functions. Fundamentally, one aims to regress gross output on measurable as well as non-measurable values of input. (Wilson and Briscoe, 2004: 40)

$$Y_t = A \, K_t^a \, L_t^b \, M_t^c \, R_t^d \dots R_{t-n}^e \tag{2.20}$$

With the help of this function we can depict past and present expenses on knowledge from the variables $R_t, \dots, R_{t-n}$. These variables essentially hold the same information as H does in equation (2.19) above. The link between the two equations suggests that, given a fixed amount of measurable inputs, past and present knowledge creates present output. Another explanation is to assume that $\{Y_t / A K_t^a L_t^b M_t^c\}$ measures total factor productivity, while past and present knowledge spur it. (Wilson and Briscoe, 2004: 40)

Nowadays, the neo-classical model is considered outmoded and oftentimes replaced by

its endogenous analogon. Yet, empirical studies are still being performed with it. Some researchers, like Sianesi and van Reenen (2003), even go as far as to draw the conclusion that outcomes from neo-classical models are indeed more coherent with conclusively proven microeconomic results than those from endogenous models. (Wilson and Briscoe, 2004: 40)

Of course, the assumptions of perfect competition and constant returns to scale that build the base of neo-classical models depict a common constraint. For instance, in equation (2.18) diminishing returns via the aggregation of capital returns constitute one of the production function's pivotal features. This characteristic would mean the eradication of any economic growth if technological change was omitted. (Wilson and Briscoe, 2004: 40)

While the same problematic still exists in equation (2.19), the introduction of human capital has a positive effect of tangible assets on the long-term stable degree of output. Above all, it is responsible for an incredible deceleration of a worldwide harmonization of income levels. (Wilson and Briscoe, 2004: 40)

2.1.4. THE AUGMENTED SOLOW MODEL – INTRODUCING EXTERNALITIES TO EDUCATION

In economics it is a given that the more educated an individual is, the higher their earnings are. For this reason, one could conclude that the average wages of the population were to increase if a higher number of people pursued an education. Moreover, positive externalities to education would result in average wages of the population outweighing the total of results on the individual level. In the second half of the last century it has been widely assumed that extending education to the masses stimulates the economy. Never before in human history did as significant an extension of education take place as it has been happening for almost half a century now. (Pritchett, 2001: 2)

The question remains whether the vast increase of education around the globe has been successful and whether there is substantial proof of externalities to education that have positive effects on the economy. The previously introduced growth theory as well as empirical evaluations aim to provide answers to these questions. As mentioned above,

such positive externalities result in a more significant effect of education on the overall outcome than all the individual effects of education combined. The determination of such externalities calls for micro- as well as macroeconomic models of effects of education, which in further consequence should be consistent. (Pritchett, 2001: 3)

Pritchett (2001: 3) introduces the augmented Solow model as a satisfactory model, since "it predicts the 'no externality' impact of education should be the share of educational capital in factor income." Proof therefore can be derived from microeconomic findings on increases of earnings to capital. The augmented Solow model suggests that instead of the influence of education on growth outweighing the individual effects, it lacks significance. Available information from cross-country comparisons shows that there are indeed negative externalities, which imply an inconsistency between micro- and macroeconomic results.

Reconsider the Model by Mankiw, Romer and Weil (1992) as previously defined in equation (2.19) by $Y_t = A\,K_t^a\,L_t^b\,H_t^c$, dropping the term M here for the sake of convenience. A linear equation in levels can be created by applying following assumptions; the returns to scale are to be constant, i.e. $a + b + c = 1$, the labor stock needs to be normalized, and the natural logarithm needs to be applied. Note, that these assumptions are an indicator for the growth rate. (Pritchett, 2001: 4)

In order to avoid approximations at the levels and the difficulties that would bring, Pritchett further examines the annual per capita output growth, changes of physical capital per capita, and finally what he calls per capita "educational capital". For all of these variables, growth can be obtained by applying the logarithmic least squares for the full time span. (2001: 4)

In order to determine the annual output growth per worker define $\Delta Y = \frac{d\ln(\frac{Y}{L})}{dt}$. Subsequently, this definition renders following equation, where ΔA denotes the rate of growth of the growth accounting residual. (Pritchett, 2001: 4-5)

$$\Delta Y \;=\; \Delta A \;+\; a\Delta K \;+\; c\Delta H \tag{2.21}$$

As was already stated above, (2.19) can be transformed and subsequently ΔA is defined as

$$\Delta A = \Delta Y - a\Delta K - c\Delta H \qquad\qquad (2.22)$$

With the use of the augmented Solow model it is possible to approximate the ideal significance of growth of educational capital via methods that do not depend on regression. The allotment of determinants can be determined as the weights from the cumulative Cobb-Douglas production function. In fact, by means of growth accounting regressions, one can estimate educational capital by the amount of educational capital of GDP. The latter can easily be approximated through available microeconomic information. (Pritchett, 2001: 5)

Assuming constant returns to scale, the share of labor equals one minus the share of physical capital. One can expect a share of physical capital of around 0.4. While this might appear high, there are various indicators that confirm this presumption. On the one hand, there are statistics from regression parameters as well as from national records. On the other hand, rates of capital output strengthen this choice. Consider a capital-output (K/Y) ratio of 2.5 and a return rate of capital of about 16% then by multiplying these two ($r \cdot K/Y$) one gets a share of capital of 40%. Since the share of labor was previously defined as one minus the share of capital, this results in a labor share of 0.6. (Pritchett, 2001: 5)

Pritchett (2001: 5) now brings up the question of the influence that educational capital has on the labor share. A quite straightforward method of determining the influence of human capital on the labor stock is to divide wage w_0, which stands for the unskilled labor force or in other words the "zero human capital", by the average wage $\overline{w}$:

$$\text{Share of human capital} = 1 - \frac{w_0}{\overline{w}} \qquad\qquad (2.23)$$

In their paper Mankiw, Romer and Weil (1992) argue that as much as half of the wages can be traced back to human capital. In order to substantiate this proposition they employed the ratio of recorded average minimum wages in the US. Another study considering the wage distribution in South America comes to a similar result, estimating an influence of human capital on wages of 50 to 75%. According to both of these results, one can expect the human capital coefficient c to be 0.3 or higher. (Pritchett, 2001: 6)

Exploiting microeconomic indications, one could estimate the share of educational

capital through acquiring an increase of wages from education. In the next step information on the share of labor force at all levels of schooling would be employed and ultimately the percentage of educational capital would be derived. Following equation demonstrates how to obtain the proportion of the wage bill stemming from level of schooling. It takes use of a starting wage for all of the respective levels of schooling. (Pritchett, 2001: 6)

$$\text{Share of educational capital of the wage bill} = \frac{\sum_{i=0}^{K}(w_i - w_0)\cdot\gamma_i}{wL} \tag{2.24}$$

In this equation the control variable i denotes the level of schooling, whereas γ_i stands for the respective share of labor force. (Pritchett, 2001: 6)

Assuming a consistent raise of wages by 10% per year of educational attainment, then the share of educational capital of the wage bill reaches from 26.3% in countries in Sub-Saharan Africa up to 62.1% in OECD member states. For an agglomeration of developing countries this share has been calculated to amount 36.4%. Further, assume different wage increments according to level of schooling, i.e. a raise of wages of 16% for primary, 12% for secondary, and 8% for higher per year spent at school. Then the share of educational capital of the wage bill reaches from 38% in Sub-Saharan African nations to 73% in OECD countries. The agglomeration of developing countries reaches a share of 49% in the face of these assumptions. Either of these evaluations prompts for the conclusion that the share of educational capital of the wage bill lies between 0.35 and 0.7. From these results one can obtain c, the educational capital's growth accounting regression coefficient. Thus, the coefficient lies between 0.21 and 0.42, with about 0.3 marking the mean between the two. (Barro and Lee, 1993; Pritchett, 2001: 7-8)

2.2. NEW GROWTH THEORIES

2.2.1. THE ENDOGENOUS GROWTH PRODUCTION FUNCTION

New growth theories can be differentiated from the neo-classical Solow model as they stress the endogenous measurement of growth rates. As the word endogenous suggests, new growth theories establish the growth rates from within the model. That means they are susceptible to influences, such as government policies, as opposed to being controlled by exogenous technological change. (Sianesi and van Reenen, 2003: 163)

For a long time the impact of education has been underrated in neo-classical models. In any case, new growth theories have been essential in strengthening the role of education. These models build the base for the conclusion that there are two principal ways of how education influences a country's economic growth. (Sianesi and van Reenen, 2003: 163)

Firstly, as opposed to the neo-classical model, human capital is now introduced to the production function as a factor input. The restraint of constant returns to scale becomes obsolete as individuals' choices on their spending on education are reflected in the model and external impacts of human capital are granted. (Sianesi and van Reenen, 2003: 163)

Secondly, human capital is directly associated with the variables spurring endogenous growth, and especially with technological progress at that. On the one hand, the cause therefore might stem from the fact that human capital is a straightforward generator of fresh knowledge and technology. On the other hand, human capital can be viewed as a crucial contributor to research, which anon produces knowledge and technology. (Sianesi and van Reenen, 2003: 163)

In a nutshell new growth theories can be divided into two major natures. The first includes the impacts of aggregation and movements of human capital, while the second deals with the reserves of human capital. What does this differentiation suggest? The first approach implies a conclusive impact of policy actions, like financial assistance to education to stimulate the degree of human capital, on output. Even so, in the second framework the economy's growth rate could raise indefinitely due to the same policy actions. As of now, none of the two approaches has been established as the "right" one in empirical literature. (Sianesi and van Reenen, 2003: 163)

Experience has shown that outcomes verifying the accuracy of endogenous as opposed to neo-classical growth models are ambiguous. Macroeconomic theory cannot offer a comprehensive distinction of the two models, for their empirical outcomes tend to be equivalent. While the big picture shows that both models suggest very much alike forecasts concerning the effects of human capital on growth, how exactly human capital spurs growth remains the subject of mere speculations. Indeed, both models share the assumption that output growth is considered a function of human capital's growth rate.

In a broader sense, macro theory has lost sight of the regression of the two models against each other, while lingering on a vast amount of variables that have become increasingly popular because of recent works. (Sianesi and van Reenen, 2003: 163)

Many regressions used the reserves of human capital as a descriptive component, consequently obtaining incentive and legitimacy from endogenous growth theory. One should not forget that growth of productivity cannot only be pinpointed as a result of the intermediate timespan. In fact, the rising movements of education trigger a steady growth of the average reserves of human capital. It is an inherent allegation that the promotion of the equilibrium of an economy's education has a long-lasting positive impact on the economy's growth rate. As a matter of fact, this effect can still be witnessed once the degree of human capital reserves has been restored to a long-term value. (Sianesi and van Reenen, 2003: 164)

According to endogenous growth models, the impact of human capital should outweigh the mere constant influence it has on the output. Given the argument that human capital spurs innovative processes, higher degrees of human capital would impact the growth rate of outputs. (Sianesi and van Reenen, 2003: 160)

Summed up, the crucial difference between endogenous growth models and neo-classical models is that the former deliberately include technology. This introduction of technology corresponds to the variable A in the equations (2.18), (2.19), and (2.20) from above. In addition, endogenous growth models aim to acknowledge the impact of economic decisions on technological change, which is about as influential in this context as it is on capital accumulation. In endogenous models, educational investments are used to characterize the share of human capital, which is a central aspect in technological change. (Wilson and Briscoe, 2004: 40-41)

As was mentioned before, the assumption of constant returns to scale in neo-classical models often proves to be of a strict limitation. In respect to these ambitious constraints it is a quite complicated endeavor to incorporate knowledge distribution and technological change in neo-classical models. Assumptions of endogenous models allow for economic growth to take place over an indefinite time horizon. (Wilson and Briscoe, 2004: 41)

According to Wilson and Briscoe (2004: 41) this is "because the returns on investment in a broad class of both physical and human capital goods do not necessarily diminish through time". These returns include exterior advantages of enhanced human capital as well as an overflow of knowledge applying to a number of producers. Such developments compensate inclinations towards diminishing returns. Furthermore, literature on growth theories, including works by Romer (1986) or Barro and Sala-i-Martin (1995), have introduced notions of imperfect competition and research and development.

A plethora of requirements for endogenous growth has been proposed. Barro (1997) introduced following common requirement for growth across multiple nations in his paper. (Wilson and Briscoe, 2004: 41)

$$\Delta y \ = \ f\left(\,y, y^{*}\right) \tag{2.25a}$$

$$y* = \ f\left(\,Z\,\right) \tag{2.25b}$$

Here, Δy denotes the rate of change of per capita output and y^{*} stands for the degree of per capita output in the long run, while y depicts the present value of per capita output. Assuming y is fixed, as y^{*} inclines so does the growth rate. One must not forget that y^{*} is made up of various influences, such as environmental, economic, and policy decisions. While different studies have a different approach on these decisions, according to Wilson and Briscoe the variable Z from equation (2.25b) commonly includes "variables measuring population (fertility and life expectancy), labour supply, government expenditure and investment, terms of trade, inflation and, most significant for present purposes, educational variables." (2004: 41)

2.2.2. THE ROMER MODEL WITH PERFECT COMPETITION – AN 'AK' APPROACH TO ENDOGENOUS GROWTH

In a model economy with given variables of output, i.e. labor and technology, diminishing returns to the aggregation of capital are imminent. It has been mentioned before that the assumption of such diminishing returns is responsible for the strict constraints of the neo-classical model. In order to avoid such limitations a new kind of model was developed. These models are often called "AK models", since their typical

production function can be written as

$$Y \ = \ AK \tag{2.26}$$

where *A* stays at a fixed level. Obviously, the idea behind these models is that either labor or technology naturally increases proportionally to capital. The other of the two factors compensates the occurring diminishing returns. Likewise, the output can increase proportionately to capital. (Aghion and Howitt, 1998: 24)

Needless to say, there are two major trends of models. On the one hand, there are models, as developed as early as in 1939 by Harrod and in 1946 by Domar, which set labor as the factor that increases with capital. On the other hand, models like the ones developed by Frankel in 1962 or Romer in 1986 consider technological knowledge as the determinant that is linked to the growth of capital. (Aghion and Howitt, 1998: 24-25)

The fundamental thought behind Frankel's and Romer's models is to consider technological knowledge in itself as a form of capital. As a matter of fact, the utilization of technological knowledge together with additional inputs eventually results in the ultimate good. Special properties of technological knowledge include that even when it is used to create output it can never be consumed entirely; in consequence, it keeps well for longer periods of time. Additionally, research and development as well as other forms of knowledge formation contribute to the proliferation of technological knowledge. Such behavior means that present resources are knowingly used (and sacrificed) for future advantages. Viewed in this light one can describe knowledge as an immaterial capital commodity. Since *K* is essentially made up of various capital commodities, one can conclude that technological knowledge is a part of this conglomerate. (Aghion and Howitt, 1998: 25-26)

Even though Frankel has made his first attempts on endogenous growth theory with his works on the AK model as early as in 1962 it was more than three decades later, in the mid-1980s, that somebody picked up his works again and developed further studies in the field. According to Aghion and Howitt it was Romer (1986) who "cast his analysis in terms of the Ramsey model of inter-temporal utility maximization by a representative individual, taking into account that individuals do not internalize the externalities associated with the growth of knowledge." Romer's research became widely known

because of the work of Lucas (1988). Nowadays it is without a doubt one of the most important works on endogenous growth. (1998: 27)

The center of Romer's model revolved around a production function with similar externalities to the one in Frankel's work. More importantly, Romer "focused on the case in which the labor supply per firm was equal to unity and the rate of depreciation was zero. Saving was determined by the owner of the representative one-worker firm, whose dynamic optimization problem was to

$$\max \int_0^\infty u(c_t)e^{-\rho t}\, dt \tag{2.27}$$

$$\text{s.t.}\ \dot{K} = \bar{A}K^\alpha - c \text{ and } \dot{K} \geq 0$$

taking the time path of $\bar{A}$ as exogenously given." (Aghion and Howitt, 1998: 27)

The Euler condition

$$-\varepsilon\frac{\dot{c}}{c} = \rho - \alpha\bar{A}K^{\alpha-1} \tag{2.28}$$

can be obtained by supposing the inter-temporal elasticity of substitution is constant, i.e.

$$u(c) = \frac{c^{1-\varepsilon}-1}{1-\varepsilon} \tag{2.29}$$

Subject to the assumptions that individuals have rational expectations and that all firms are identical, individuals accurately predict that all firms select the same degree of capital at any point in time, resulting in the equation $\bar{A} = AK^\beta$. (Aghion and Howitt, 1998: 27)

After having applied these alterations, the previously introduced Euler condition is now given as (Aghion and Howitt, 1998: 27)

$$-\varepsilon\frac{\dot{c}}{c} = \rho - \alpha AK^{\alpha+\beta-1} \tag{2.30}$$

Now, consider what happens if returns to capital are constant, or put in mathematical terms, the case of $\alpha + \beta = 1$. Under these circumstances, the economy's growth rate g is strictly positive and finite. This situation implies that diminishing private returns to capital are only compensated by the external ameliorations of technology $\bar{A}$ that they

cause. As a consequence, (2.30) indicates that

$$g = \frac{\alpha A - \rho}{\varepsilon} \tag{2.31}$$

Upon drawing conclusions from this equation, the steady state rate of growth g decreases depending on following three factors. The first determinant is characterized by an increase in the discount rate ρ, i.e. a reduced incentive to save. Secondly, a lessening inter-temporal elasticity of substitution $\frac{1}{\varepsilon}$ contributes directly to the rate of growth. The third influence on g are diminishing private returns to capital K, which in other words, means a smaller α. (Aghion and Howitt, 1998: 27-28)

Aghion and Howitt (1996: 28) add that whereas the technology variable A was previously assumed to be equal to the average aggregated capital, now consider the case of A as equal to the total amount of aggregated capital. This assumption implies that in the equilibrium $\bar{A} = A(LK)^{\beta}$

$$g = \frac{L^{1-\alpha} A \alpha - \rho}{\varepsilon} \tag{2.32}$$

This equation clarifies that more firms L imply a higher number of externalities for the economy from the creation of technological knowledge. Ultimately, economic growth will be spurred by a higher L. Put differently, one can observe a positive correlation between the rate of growth and the scope (or, in other words, scale) of the economy, which in this example corresponds to the amount of firms. The majority of endogenous growth models include this scale effect. (Aghion and Howitt, 1998: 28)

Judging by the scale effect, one might conclude that freedom of trade has a positive impact on economic growth. While there had been research in favor of liberalizing trade before the emergence of endogenous growth theory, it remained limited to the static case. In fact, endogenous growth theory was the first approach to support free trade with a dynamic model. As a matter of fact, neo-classical research, as was introduced in the earlier course, did not consider the trade-off between economic growth and trade at all. (Aghion and Howitt, 1998: 28)

According to Romer's assumptions $\alpha + \beta > 1$ holds; i.e. social returns to capital are increasing according to him. In other words, by definition, growth increases incessantly.

Assuming diminishing returns $\alpha + \beta < 1$ yields results alike the Solow model without technological change, i.e. growth decreases asymptotically. (Aghion and Howitt, 1998: 28)

According to Aghion and Howitt (1998: 28) one can draw a number of important conclusions from Romer's model.

Suppose social returns to capital; in that case economic factors, such as the discount rate and the scale of the economy are of a significant impact for long-term economic growth. One must not forget that the discount rate can also be interpreted as the incentive to save and the scale of the economy is equivalent to the amount of firms. (Aghion and Howitt, 1998: 28)

The socially optimal growth rate outweighs the average rate of growth g as defined by (2.30). This occurs due to the fact that individuals and singular firms tend not to incorporate the results of private aggregation of capital on knowledge $\bar{A}$, which is subject to optimal values of c and K. (Aghion and Howitt, 1998: 28-29)

Even after endogenizing growth, it is still exclusively dependent on external knowledge aggregation. In order to change the fact that external aggregation of knowledge is unpaid, one can install compensations to technological advancement. Since this modification eradicates the assumption of perfect competition, the model's degree of complexity increases. (Aghion and Howitt, 1998: 29)

Assuming $\alpha + \beta = 1$, then the growth rate of the economy can be changed lastingly through cross-national alterations of the variables α and ρ. AK models can not foresee the "conditional convergence in income per capita; the cross-section distribution of income should instead exhibit both absolute and conditional divergence." (Aghion and Howitt, 1998: 29)

According to AK models, technology is a crucial factor for monetary policies to be beneficial for the economy. Neo-classical models include the possibility of the economy to abundantly compile financial assets. A vast amount of financial assets implies that the expenses of predestined utilization outweigh their marginal product. In this case the amount of financial assets has a respective small marginal product, while the utilization

expenses are caused by the restoring of devalued machines. Here, one can observe the effect of "dynamic inefficiency", where scaling down the financial assets would cause a growth of expenditure at all times. Nevertheless, the marginal product in AK models is fixed. That is to say, the effect of dynamic inefficiency will not occur, even granted a vast amount of financial assets. (Aghion and Howitt, 1998: 29)

2.2.3. MULTI-SECTOR GROWTH MODELS

This section offers a short introduction to multi-sector growth models. It seemed sensible to add this extension to the more general approaches from above. Especially when considering the differences in sectors one faces when comparing China and the EU it becomes very clear that this type of models should be pointed out to the reader. One should consider that, in the real-world, China is comparatively more technology driven and focused on the production of goods, while Europe is pointing its attention more towards the service sector. It makes only sense that these tendencies can also be found in the respective education systems. Thus, higher education in China will put more weight on teaching the students scientific and technological subjects, while European students will tendentially receive education that is heavier on the social sciences. Note though, that the services sector might contribute less to economic growth than the production sector does.

Consider the two-sector models of endogenous growth as presented by Barro and Sala-i-Martin (1995: 171-172). In their research they particularly focus on the role of human capital. As part of their assumptions, they make it possible for human and physical capital to be created from differing sources of technology. They find it extremely important to acknowledge that producing human capital, which in other words equals education, requires very high levels of human capital as inputs. They argue further that some researchers like Lucas (1988) take human capital to be the sole input to education. Such assumptions on the production framework have tremendous impacts on how human and physical capital affect economic growth. These impacts come from the positive effect of the physical to human capital ratio on real wages, and indeed from the opportunity costs resulting from human capital dedicated to education.

The existence of human capital can loosen the constraint of diminishing returns and can accordingly be a trigger for long-run growth per capita, without exogenous technological

change. For this reason, producing human capital could be an alternate option to technological progress in order to achieve economic growth in the long run. Nevertheless, one must not forget that the aggregation of human capital does show several distinctions from knowledge formation when it comes to technological progress. For example, consider human capital as a worker's skills. Obviously, when the worker applies this set of skills for a particular activity, then they cannot employ the same skill in another activity. As a matter of fact, by definition human capital would be a rival good. What is more, property rights that people possess over their skills and their raw labor make human capital excludable. Of course, as was defined in Chapter 1, knowledge itself is a non-rival and, to a certain extent, non-excludable good. Judging from these differences it becomes quite obvious that models of technological advancement are drastically different from those of human capital aggregation. (Barro and Sala-i-Martin, 1995: 172)

Barro and Sala-i-Martin (1995: 179) introduce a model with two production sectors originating from the idea that physical goods and education require different sets of technology for their production. By regarding this fact, the importance of educated individuals as a major input in education is acknowledged. In consequence, the model includes the significance of existing human capital for producing new human capital.

Amongst others, referring to the works of Barro and Sala-i-Martin (1995: 179), one can construct a model using the following two Cobb-Douglas production functions.

$$Y = C + \dot{K} + \delta K = A \cdot (vK)^{\alpha} \cdot (uH)^{1-\alpha} \tag{2.33}$$

$$\dot{H} + \delta H = B \cdot [(1-v) \cdot K]^{\eta} \cdot [(1-u) \cdot H]^{1-\eta} \tag{2.34}$$

Y denotes the output of gross investments in physical capital goods and consumer goods. The parameters A and B, with A, B > 0, are technological determinants, while the exponents α and η, with $0 \leq \alpha, \eta \leq 1$, stand for the shares of physical capital of output in the respective sectors. Lastly, v and u, with $0 \leq u, v \leq 1$, describe the corresponding portions of physical and human capital spent on production. In other words, the respective portions of physical and human capital spent on the production of human capital, i.e. education, are given by $1 - v$ and $1 - u$. (Barro and Sala-i-Martin, 1995: 179)

One can deduct from equation (2.33) that on the supply side consumer goods, C, and investments in physical capital, $I_K = \dot{K} + \delta K$, can be employed as ideal substitutes. That is to say that C and I_K stem from the same source of output for goods. Under the assumption of $\eta \neq \alpha$, (2.34) suggests that human capital and physical goods are developed from different technologies. Barro and Sala-i-Martin claim that $\eta < \alpha$ is prevalently true. As has been mentioned before, this is the case since the goods sector generally uses more physical capital inputs, while the education sector rather makes use of human capital. Due to this phenomenon it is sensible to define H as the human capital that can be witnessed in reality. (1995: 179-180)

Equations (2.33) and (2.34) result in the fact that "the two production activities each exhibit constant returns to scale in the quantities of the two capital inputs." Therefore, "the model will display endogenous steady state growth of […] a one-sector model." The two fractions v and u are both constant in the steady state, while the parameters C, K, H, and Y share the same rate of growth, γ^*. (Barro and Sala-i-Martin, 1995: 180)

One can expand the observable output by gross investment in human capital, which is defined here as $\dot{H} + \delta H$, which is, to be precise, multiplied by a corresponding shadow price. Like the parameters C, K, H, and Y, this extended concept of output has a growth rate of γ^* in the steady state. At this point should be mentioned that gross output can generally be found in between the narrow and broad measures of output. This is because of the fact that a portion of the gross investment in human capital is part of the observable output. Consider for instance that teacher salaries are contained in the gross product, while time dissipated by students and some of the time spent on on-the-job training are not included. (Barro and Sala-i-Martin, 1995: 180)

2.2.4. THE DAY MODEL – A CHAOS THEORETICAL APPROACH

The last model to be introduced in this chapter was developed by Day (1982) and is presented in great detail by Lorenz. The model introduced here makes it comparably easy to represent the intricate dynamic nature of an economy. It seems essential to mention this model of chaos theory at this point since it offers an insight into the consequences of pollution measured by per capita output. This important factor should not be neglected, since technology intensive nations, as is the case with China, tend to

produce high amounts of pollution.[1] (1993: 138-143)

According to Lorenz (1993: 139), Day's (1982) innovative ideas lay the tracks for the identification of chaotic dynamics in economies. As for the models above, once again the neo-classical growth model is used as the basic of this approach. The core equations of the model can be written as below, using discrete time and under the assumption of a capital stock that is valid for precisely one period of time.

$$Y_t = C_t + I_t \tag{2.35}$$

$$I_t = K_{t+1} \tag{2.36}$$

$$S_t = Y_t - C_t = s \cdot Y_t, \; s > 0 \tag{2.37}$$

$$Y_t = F(K_t, L_t) \tag{2.38}$$

$$L_t = (1 + n)^t L_0, \qquad n > 0 \tag{2.39}$$

In (2.35) – (2.39) Y, C, I, K, L, and S have the conventional meanings that have been discussed previously. While additionally s denotes constant marginal rate of savings, n stands for the constant rate of growth of population. Obviously, the production function is of linear-homogenous form. This property suggests that the model can be transformed as follows. (Lorenz, 1993: 139)

$$\frac{K_{t+1}}{L_t} = s \cdot F(K_t, L_t)/L_t \tag{2.40a}$$

Or synonymously,

$$k_{t+1} \cdot (1 + n) = s \cdot f(k_t) \tag{2.40b}$$

As before, $k_t = K_t/L_t$ stands for the capital-labor ratio. (Lorenz, 1993: 139)

Lorenz (1993: 139) explains that assuming convexity suggests the existence of two fixed points. One of them is repelling – this one is the origin. The other one, which will be referred to as k^* in the further course, is asymptotically stable and solves

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[1] However, be aware that as a result of the undeniably tremendous extents of pollution, China has started to make attempts in promoting cleaner industry. (Silk, 2013)

$k^* = s \cdot f(k^*)/(1+n)$. The cause of major differences between the standard neo-classical model and Day's new concept is a new type of production function. It is given by

$$Y_t/L_t = f(k_t) = B \cdot k_t^{\beta} \cdot (m - k_t)^{\gamma}, \; k_t \le m \text{ constant.} \tag{2.41}$$

As mentioned in the beginning of this section, the impact of pollution on per capita output can be derived from this equation. According to Day (1982) it is the term $(m - k_t)^{\gamma}$. He proposes that with higher capital intensity, higher pollution can be witnessed. To make up for this pollution, it is necessary to spend resources. Resulting from this reasoning, subjected to a fixed capital stock the maximum output that can be achieved does not reach the level that the usual model would suggest for any value of k. Thereby, the constant m functions as a kind of saturation level. That is to say if $k_t = m$, per capita production would reach zero. (Lorenz, 1993: 139)

Applying (2.41) to (2.40b) results in

$$k_{t+1} = s \cdot B \cdot k_t^{\beta} \cdot (m - k_t)^{\gamma}/(1+n) \tag{2.42}$$

Next, in order to simplify this equation Lorenz (1993: 139) introduces the case of $\beta = \gamma = m = 1$. Then (2.42) can be written as

$$k_{t+1} = s \cdot B \cdot k_t \cdot (1 - k_t)/(1+n) \tag{2.43}$$

By defining $\mu = s \cdot B/(1+n)$ Lorenz claims that (2.43) is a logistic equation. This kind of equations describe the simplest process of chaotic behavior in discrete time, dependent on the range of parameters, in which μ can be found. (1993: 122-133, 140)

2.3. THE WORKS OF BARRO – EMPIRICAL EVIDENCE

Wilson and Briscoe (2004: 44) devote an essential part of their paper to introducing the reader to recent works by Barro (2000). In his paper, Barro illustrates empirical findings from his cross-country data set, which has been revised with information up to 1995.

Barro (2000) works with data from over 80 countries in a timespan of no less than 30

years. The countries were divided into different clusters depending on their respective stage of development and the timeframe was broken down into three 10-year units. Barro (2000) took use of regressions of real per capita GDP against a variety of determinants, reconsider equations (2.32a) and (2.32b) for better understanding. Nevertheless, some of the determinants were accessible only for five-year time spans, or for even shorter periods of time. Hence, in order to obtain satisfying results, averages had to be taken into consideration. Regarding key education variables Barro (2000) used available numbers for the start of every 10-year term. (Wilson and Briscoe, 2004: 44)

Barro (2000) relies upon a main education variable that has been revealed by previous empirical research. This variable marks the average years of schooling at the secondary and higher stage, which are otherwise referred to as the upper levels, for men of 25 years of age and older. In any case, there has been follow-up research that suggests a number of additional standards for determining educational achievements. These standards include "primary school attainment, attainment by females and results on internationally comparable examinations". (Wilson and Briscoe, 2004: 44)

Due to various difficulties of measurement across nations, one is more likely to regard the numbers of educational attainment at the start of a term, rather than considering educational flows. Three-stage least squares are employed in the model. These are obtained by the use of instrumental variables. The interested reader is kindly asked to refer to Table 1, which can be found as part of the appendix, for a more detailed listing of basic conclusions of Barro's research. Generally speaking, the effect of variables of education is significantly positive, although a number of additional policies need to be taken into consideration as well. Ultimately, by regarding the approximate coefficient, one can conclude that an extra year of educational attainment increases the annual growth rate by 0.44%. (Barro, 2000; Wilson and Briscoe, 2004: 44)

According to Barro (2000) this outcome suggests that if the labor force has received secondary and higher education, technologies from higher developed countries can be adapted more easily. His research further proposes an influence of an additional year of school on the rate of growth of GDP. (Wilson and Briscoe, 2004: 44)

Next, Barro regarded the average expenses per added year of educational attainment

and additional information on the national rates of convergence. These presumptions yielded results on the coefficient value and its significance on the real social returns on schooling. (Wilson and Briscoe, 2004: 44)

To be precise Wilson and Briscoe (2004: 44) cite Barro's (2000) findings, who states that a "coefficient value of 0.0044 implies a real social rate of return on schooling of the order of 7 % per year;" these results are in line with the returns on education that would be expected from microeconomic evaluations.

Another critical point that Barro (2000) tries to include in his model is quality of education. As will be mentioned later in greater detail, there is not one single correct way to evaluate this variable. In his model, Barro (2000) relies upon results of international examinations in order to obtain reasonable values for quality of education. (Wilson and Briscoe, 2004: 45)

Several researchers, like Hanushek and Kimko (2000), argue that aforementioned standards for quality of education show a greater impact on economic growth than the mere number of years spent in school. It was only recently, and largely restricted to wealthy nations, that such data on quality of education has been gathered. Considering achievements in scientific subjects as a standard of quality of education, one can observe a significant influence of these achievements on economic growth. Mathematical achievements have also proven to have a positive influence on growth, albeit less significant than scientific achievements. Interestingly enough, a significant influence of achievements in reading on growth could not be detected. Regardless, one must not forget that the incompleteness of the information might cause these results to be somewhat distorted. (Wilson and Briscoe, 2004: 45)

3. DETERMINING QUALITY OF HIGHER EDUCATION

3.1. WHAT DOES QUALITY IN HIGHER EDUCATION MEAN?

The issue of quality assurance has increasingly become incorporated on a global level. In this respect it is a point of interest in countries of various cultural heritage and degrees of economic development. Likewise, it is essential to look for possible triggers of this development, as well as to study the magnitude of these different impacts on future progresses. (OECD 2009b: 327)

As easy as it is to put a label of quality on industrial goods like cars and even on services, when it comes to higher education and research it is almost impossible to establish a satisfying measure of quality. This is due to the fact that - as opposed to for goods and services - there is no generally applicable production function for higher education, i.e. there is not one single best approach of converting input into output. Instead, for higher education a number of acceptable paths can be determined. (World Bank, 2010: 4)

Where exactly does this ambiguity stem from? Obviously, various explanations exist for this phenomenon. Firstly, in higher education there are two kinds of inputs; students and teachers. These two factors share only very few similarities. Their achievements depend on a variety of influences, such as "the quality of their working environment, in particular buildings, teaching and scientific equipment, including the new technologies of information and communication and on the content of the curricula and courses, as well as the way they are taught." (World Bank, 2010: 5)

Secondly, one has to evaluate the outcomes as well as the effects of higher education. This can in fact prove to be even more problematic, since the quality of results from higher education is almost impossible to quantify. The sole way to properly assess the quality of higher education is relative to "knowledge profiles demanded on the labour market and [...] society in general". Yet, these standards are various and oftentimes they are subject to slow changes. (World Bank, 2010: 5)

Thus, it is obviously a challenging task to rightfully assess the quality of higher education. Higher education systems portray distinctions across nations, which are to a certain extent tremendous. In addition, the roles and positions of institutes of higher

education within the structure of higher education can hardly be compared. Hence, the perfect production function for higher education turns out to be quite ambiguous. (World Bank, 2010: 6)

Given the disparities of higher education systems it appears only sensible that within the EU numerous attempts, such as the Bologna Process, have been put into place in order to remove some differences. Some of the best-known alterations being the partition of studies into three stages, the determination of learning results, the introduction of a European qualification system, and the "Dublin Descriptors". Without meaning to play down the importance of these attempts, one must not forget that they are mere guidelines for a unified approach to determine what students should learn and to systematize the resulting knowledge. In any case, the question remains of what the best way is to promote students coming from different environments and trainings, with different qualifications and experience, and not least with different passions. It all comes down to this diverse pool of individuals to fulfill the demands of the labor market of tomorrow, and of society as a whole. (World Bank, 2010: 6)

Following statement by the World Bank (2010: 7) about the duties and procedures of higher education institutions should be kept in mind when investigating questions of quality insurance in this context. "HEIs [higher education institutions] operate in a complex system of incentives and constraints, rewards and sanctions, which is often non-transparent and even contradictory."

3.2. THE IMPACT OF EDUCATIONAL QUALITY ON ECONOMIC GROWTH

Not quite accurately, research oftentimes treats quality of schooling and the number of years spent on education as equal. Be aware, however, that this vague definition does not do the significance of education any justice. Especially when considering education in different countries it becomes quite obvious that the mere amount of time spent on education does not fully express the differences in knowledge across nations. By way of example, students' achievements in the course of one year in countries like Nepal can hardly be compared to those of students in Austria in the same amount of time. Regardless, comparing the years of schooling in order to evaluate quality of education is trying to get answers exactly on those unorthodox grounds. (Hanushek and Woessmann, 2007: 25)

A year of school is only as good as the quality of the educational system of which it is part. Hanushek and Woessmann claim that the skills acquired because of education have to be considered in relation to "the efficiency of the education system, the quality of teaching, the educational infrastructure, or the curriculum." Accordingly, when one is looking for a link between education and economic growth, they need to shift their attention away from the amount of time spent on schooling towards the knowledge that has actually been obtained at school. (2007: 25)

The second disadvantage when using years of education as a measure, is that this constraint suggests that all knowledge and human capital is solely produced at institutions of education. Still, numerous sources point out that there is a plentitude of contributors to knowledge creation apart from schooling. These contributors include one's family and friends, as well as many other people, who have a very significant and immediate impact on the formation of cognitive skills. Not to consider these additional determinants would cause tremendous miscalculations in growth analysis. (Hanushek and Woessmann, 2007: 25)

3.3. THE FUTURE OF HIGHER EDUCATION

3.3.1. PROVIDING HIGH QUALITY EDUCATION IN THE 21ST CENTURY

It goes without saying that modern day students need to acquire the appropriate skills and knowledge to be successful in the economy of the 21st century. In the past decades the amount of available data has become sheer ungraspable, as can be illustrated by the vast amount of data available online. In the Western World people generally pursue as many as four to five different careers in the course of their lives. This is partly because of the quickly changing job market and to jobs appearing and disappearing as a result of these changes. There are several skills that will be of an essential value in the job market of the future. (Ehrmann, 1996: 11)

First, one needs to be able to quickly detect rapidly evolving problems, especially in new situations. Undoubtedly, there might be similarities of past and future problems, however, unless these problems have been accounted for and clarified, such coherences can be nearly impossible to grasp. Needless to say, after detecting a problem one needs to fix it. In the modern world, detecting and fixing problems is more often than ever

before a task that can be achieved almost exclusively by means of information technology. So, the detection and fixing of problems can turn out to be much more complex than in the past, but at the same time due to information technology these tasks can also prove to be simpler. (Ehrmann, 1996: 11)

A second set of skills that is absolutely essential in the increasingly globalized world of the 21st century is the proficiency of inter-cultural communication. Differences in ethnological and cultural backgrounds between nations, but also within a nation itself, can be very striking. Evidently, if people do not share views on ethics and ideals, it will be close to impossible for them to share common grounds in communal and political issues. Therefore, it is essential to establish such common grounds by acquiring knowledge of different cultures as well as of communication skills, in nothing else to avoid serious disputes. (Ehrmann, 1996: 11)

The third attribute that is of great significance according to Ehrmann (1996: 11) is the capability to organize and operate within teams. This goes hand in hand with the skills in inter-cultural communication, since team work should ideally be exerted within groups of people coming from multi-national backgrounds. Undeniably, it has become a well reported fact that employers are nowadays increasingly looking for team players. Nevertheless, until today the acquisition of this important skill is hugely underrepresented in schools and universities around the globe. With the growing web of relations between nations, working together in international settings will continue to be of rising concern.

Lastly, it is necessary to possess intelligent ways of analyzing learning contents, so as to classify these contents and competently develop effective methods for studying. Once again, in today's world learning will often be linked to new forms of information technology. In the years to come, keeping up with the newest accomplishments of information technology will be an essential part of general life-long-learning. (Ehrmann, 1996: 11)

What all of the skill sets mentioned above have in common, is the need for "deep learning". That is to say, individuals should be capable of employing the new learning contents to observations made in the past. In the best case, students aim to discover standards and fundamental laws in the course of deep learning. This happens parallel to

a constant review of documentation and an evaluation of possible results. Even so, research has shown that deep learning is a very complex task. According to some studies, even students with exceptional records were not able to grasp the basic scientific concepts, which made up the center of their studies. (Ehrmann, 1996: 11)

3.3.2. DEFINING QUALITY STANDARDS FOR HIGHER EDUCATION

According to Ehrmann (1996: 13-14), the measure of quality should include three major contributors. These are access, quality and cost-effectiveness. Further, Ehrmann defines access to studies as the number of students enrolling at and graduating from their studies. By quality he refers to the realization of prosperous futures for university graduates and their societies. At last he cites that the studies later resulting in such realizations should be performed as effective as possible, hence the coining of the term cost-effectiveness.

In any case, it can be quite a challenge to gain profound results on these standards, and if so this can often only be done after their importance has long since died down. For this reason, politics and educationists tend to apply different, more process-oriented, measurements of quality. Subsequent three ways of measurement are among the most commonly applied methods for assessing the quality of educational practice. (Ehrmann, 1996: 13)

The first definition of quality has to do with an institution's property. It includes both quality and quantity of the available resources. As a consequence, universities with the most prosperous stock of resources are able to offer first rate education, and are therefore the leading universities. Ehrmann explains that universities generally store their possessions, which include "its full-time faculty, the books on its shelves, its laboratory equipment and so on" within their realms. Since it is mostly quite simple to assess an institution's resources, this definition of quality is commonly used. (1996: 14)

A second definition of quality is to measure quality according to an institution's selectivity. This concept suggests that universities, which only allow a very small number of students access to their resources, must be particularly good universities. The causes for this theory stem from past experiences. Historical means of education, such as laboratories, libraries, and even staff, were only intended for the use of small groups of

people. Some researchers extend the definition of resources by the introduction of students. According to Ehrmann, in order to better understand how students can be thought of as a resource, one needs to consider that "a major value of the institution lies either in the intellectual stimulation of a bright student body or the social value of a well-connected one". (1996: 14)

An inclusion of restrictions of the student body to the concept of quality of education raises several problems for the government. On the one hand, to accept fewer students at the university level results in this small number of students to receive a proper education, while the rest of the population might not have a chance to attend university at all. On the other hand, making university education more widely available might lead to a general degradation of higher education. Eventually, the majority of governments decide to employ a mix of both systems. Thus, first-rate resources are made available only for the best students, while at the same time dividing the remaining resources between those students, who are considered not as worthy. (Ehrmann, 1996: 14)

The third, and last, definition of quality provided by Ehrmann is "the silent, critical, creative conversation within the learner's mind that is spurred and supported by the learning environment". This definition goes hand in hand with the first one. Here, however, one does not measure the quality of resources by their expenses. Instead, the importance of resources in this definition is of whether and how they have an impact on critical thinking and knowledge absorption. (1996: 14)

3.3.3. WORTHWHILE ABSORPTION OF KNOWLEDGE

Ehrmann (1996: 14) gives four examples of how students participate in the scientific curriculum, leading to a meaningful absorption of knowledge. Firstly, the immediate interpersonal communication with staff and other specialists, as well as the rest of the student body, is of an immense importance. When considering on-campus activities, it is quite clear that this communication is taking place in real-time and can happen at any given moment, since it is easy enough for students and staff to arrange meetings among themselves. This can happen in designated places, such as lecture halls, classrooms, staff offices, and other less formal public surroundings.

Apart from this real-time interaction, the second point Ehrmann (1996: 14) indicates is

such types of communication that take place over longer periods, and are deferred in time. These kinds of interaction can take place through mediums like assignments. Once again, the on-campus interaction plays an important part in these forms of conversation.

As opposed to the above mentioned interpersonal forms of communication, students spend much of their time studying, or interacting, with inanimate objects, i.e. books, recordings, and other forms of directions about the subject of their lessons. Such information is mostly distributed among a wide array of students at the same time. (Ehrmann, 1996: 14)

A fourth, tremendously important way of absorbing knowledge is to "learn by doing". This requires the operation of equipment and other resources, which are comparable to those means available to experts. These methods include being able to work at research libraries or laboratories, and using tools like computers and research equipment. (Ehrmann, 1996: 15)

3.3.4. ADAPTING EDUCATION TO FULFILL THE THREE STANDARDS OF QUALITY

Consider once more the three definitions of quality that have been given above. Measuring quality according to these principles leads to three obstacles that governments around the world are facing when dealing with higher education. At first stands the problem of the general admission of students to higher education, with a particular focus on groups that have been omitted before. Secondly, all of the students who are about to enter university should be provided with higher education that teaches them values, which will help them master problems they will be facing in the 21st century. At last, handling these two challenges is subject to strict monetary restraints. (Ehrmann, 1996: 24)

The attentive reader might wonder which ways of motivating students for studying or of establishing meaningful contents are necessary to meet these three challenges. According to Ehrmann there are four principles that should be adapted in teaching and learning practices for a worthwhile learning-experience. (1996: 24)

First of all, a reestablishment of educational practices would have to bring an increased engagement of students in learning activities, going hand in hand with more time spent

on that account. A plethora of studies have proven that the ability to absorb learning contents increases as students devote more of their time to studying, and as they pursue their studies with more stamina and acumen. Therefore, it is only obvious, that optimally all alterations of educational environments and methods should get rid of those impediments, that keep students from spending more time on their studies. At the same time students should be stimulated to study more efficiently and with greater perseverance. (Ehrmann, 1996: 24)

A second important point that should be considered is that profound relations between staff and students, as well as between the students themselves, should widely be encouraged. Achieving profound relations for a wide range of students might seem somewhat contradicting. On the one hand, keeping expenditures per students as low as possible is essential in order to reach a multitude of students. This is due to the fact that educational activities tend to be intensive in labor. Such a series of arguments suggests that large classes are to be favored over small classes. On the other hand, profound relations between staff and students, and within the student body, are fundamental for most students' to have successful learning experiences. This is particularly true for acquiring high level skills. (Ehrmann, 1996: 25)

Ehrmann (1996: 25) points out that oftentimes lecturers do not possess sufficient insight into their students' de facto knowledge and skills. Studies in subjects like physics have shown that many students could not comprehend the underlying ideas of the topic they had been studying, even if they had achieved excellent grades. In short, to help their protégés to better absorb knowledge, competent teachers should analyze the student body and the individual students thoroughly. The question arises, though, of which methods will allow such profound teacher-student relations for a large student body.

The third wave of applying new structures to education aims to enhance teaching by transparent but extensive measures. Moreover, consistency throughout the whole studies should be a given. Obviously, it is nearly impossible to judge the relevance of individual classes or exercises for the students personally. Generally speaking, only a large amount of interrelated classes, which support the growth of relevant knowledge, is of significance to a student's life. Nonetheless, while the relevance of a single course cannot be clearly identified, access to a lone course can be determined quite easily.

Furthermore, one must not forget that educational expenditures cannot be repressed by applying inexpensive structures to a single class. In the 21st century the on-going need to stay up-to-date concerning the newest technologies can be an incentive for students, faculty and the entire university to spend more of their resources on obtaining relevant knowledge. Additionally, if the expenditures and challenges a post-secondary course of education holds in store are laid out clearly, more adult learners might be willing to sign up for classes. Now, one might ask which kinds of restructuring in organization and teaching methods can be applied extensively and consistently enough in order to meet the three previously mentioned standards of quality in education. (Ehrmann, 1996: 25)

The last form of restructuring should be to equalize the opportunities for admission to universities. This should be an essential part of future policies in order to meet the three standards of educational quality. In order to avoid a small percentage of the population to get ever wealthier, while the broad masses face a reduction of their wealth, access to universities should be spread widely and equally. For this reason, equal access to post-secondary education needs to be at the center of attention so as to provide high quality education in all three aspects. (Ehrmann, 1996: 25)

Applying new structures to higher education according to these four proposals brings up three possible ways of how to tackle the problems that meeting the three quality standards of education holds in store. First, the focus of studies should be shifted towards team-centered and hands-on activities. Second, some changes in subject matter need to be applied. Third, labor intensive teaching activities need to be split up, so as to allow for wide range, but more profound teacher-student, as well as student-student, relations. (Ehrmann, 1996: 25)

3.3.5. TEACHING PRACTICES IN THE 21ST CENTURY AND BEYOND

Today's quickly developing job market with its international demands requires high level skills and knowledge. These can be obtained particularly well in an educational setting that encourages hands-on teamwork. Above all, it is important to be constantly up-to-date regarding new forms of technology. (Ehrmann, 1996: 38)

On the one hand, it is important for universities to learn from the past, while at the other hand not clinging to tightly to past experiences. Higher education constantly evolves

over time, at the same time some aspects of education stay unchanged. Obviously, there is not one single way of how to employ perfect strategies across nations. On the contrary, how people are educated highly depends on a country's policies, as well as on the universities themselves and their needs. Regardless, what can be witnessed worldwide is the tremendous impact of technology. Where once technology bound students to the campus and the university's resources, nowadays, with the fast developments of technology and its wide distribution, students are not restrained to spend the majority of their time on campus anymore. In the further course, these changes of technology might allow students to have deeper connections with professionals and a better understanding of learning contents. (Ehrmann, 1996: 39)

The next chapter introduces rankings as a means to better understand the disparities of quality across different universities, and even more so across entire university systems.

4. BENCHMARKING UNIVERSITIES

4.1. THE GROWING IMPORTANCE OF RANKINGS

To start off with an example, managers are searching for first rate university graduates. They want the most qualified workers in their companies. More and more firm resources are being invested into finding the best. But not only among hiring specialists has the need for comparability of university backgrounds emerged. With the quality of education varying highly across nations, but also within nations, comparing degrees has become a difficult task. (Brown, Lauder and Ashton, 2008: 13)

Since the significance of higher education has increased there has been a rising appearance of universities in the media. University rankings have become very popular among students, faculty, and, generally speaking, the rest of the world. Everybody is looking for different answers in these rankings. While high school students are trying to decide which university to pick in order to obtain the best possible education, faculty members are looking for challenging research jobs; the list goes on. With the plenitude of university rankings available it has become fairly easy to find out which research institute can be considered first rate. Which university has the highest rankings in teaching? Which university offers the best math degree? Which one is the best university in a certain country, or even within a particular region or city? (Kehm and Stensaker, 2009: vii)

In a global context this popularity of rankings is a quite recent trend. In the United States such rankings and reports have been around for many decades, if not centuries. However, in other parts of the world the need to put a number on university and research performance is rather new. Only for the last decade people all around the world have started to rely upon university rankings. It has become fairly easy to access international rankings to compare universities across borders. (Kehm and Stensaker, 2009: viii)

But why has there been such an urge to rank universities? The easiest response to this question is undoubtedly the desire for making profits. In a lot of cases university rankings are the creations of media companies who strive for a new readership, which is metonymic with money. In any case, that is just one side of the coin. The whole story is,

of course, more compound than that. According to Kehm and Stensaker there are three main factors explaining the fast emergence of university rankings: (2009: viii)

As a first explanation, they argue that the growing importance of higher education seems to be a possible reason for this development. A rapidly growing number of people around the world, particularly in Asia, enjoy university education nowadays. Accordingly, higher education has turned from an elitist choice to an option for the masses. University education means an upgrading of an individual's market potential, and therefore an investment into the individual's future. The quickly expanding number of university students makes them persons of interest for the news business. It is only of a negligible value whether the students do indeed choose their future university because of the rankings. (Kehm and Stensaker, 2009: viii)

Secondly, with a growing student body the number of universities has to grow as well in order to supply the demand for higher education. As opposed to universities with a long standing history, these newly founded institutions face the need to draw attention to their names. In this case, rankings ensure that the public receives ample information about such new institutions. Even so, to be fair, one might argue that rankings often do not include these newly founded universities. (Kehm and Stensaker, 2009: viii)

The third explanation that Kehm and Stensaker (2009: viii) give for the skyrocketing of university rankings has to do with the rise of resources spent on education. This undoubtedly goes hand in hand with the growing number of students and higher education institutions. On a global level in most cases governments are the catalysts behind the financing of higher education. Thus, many governments have introduced a series of novelties to enhance their educational systems' performances. As will be discussed later, a university's autonomy needs to be endorsed in order for its performance to increase. Greater autonomy is an incentive for universities to achieve better outputs. Hence, the reforms that were initially undertaken by the governments are claimed to have led to this recent plethora of university rankings.

4.2. THE MODERN KNOWLEDGE SOCIETY IN NEED OF RANKINGS

Kehm and Stensaker (2009: xi) give a number of determinants for rankings. One of them is the knowledge society. Since the master thesis at hand seeks to explore the knowledge

economy and society of Europe and China, it appears to be sensible to focus on this particular point of discussion.

In the context of knowledge society one finds the transformation of quality and composition of knowledge at the center of attention. The rising appreciation of knowledge and its consequently increasing employment and utilization in the (labor) market are being discussed by Gibbons et al. (1994). For a long time universities have had the role of generating knowledge. In a plenitude of circumstances their beliefs have been sought out. What might be the role of rankings in this precise context? (Kehm and Stensaker, 2009: xi)

The answer to that question is that rankings operate by applying a structure to knowledge. This raises the next question of how this particular objective of rankings can trigger change within higher education systems. Lyotard (1984: 3) offers an insight into the change of knowledge "as societies enter what is known the postindustrial age". New ways of categorizing knowledge are in order; this can take place particularly through the determination of which types of knowledge are important in today's world. (Kehm and Stensaker, 2009: xii)

As rankings take on the part of screening knowledge one should not lose sight of the fact that in knowledge society knowledge can be of great significance in various ways. (Kehm and Stensaker, 2009: xii)

4.3. THE DOWNSIDE OF RANKINGS

As the number and size of universities around the globe explodes employers struggle to keep on top of which department at which university produces students of the highest quality. What is of increasing importance in these times is "reputation and branding", as stated in Brown, Lauder and Ashton. Companies have their own agendas according to which they rate universities, but they also rely on official rankings of universities. In many cases, which are particularly obvious for the US, only a small pool of elite universities is picked for recruitment. (2008: 13)

Since higher education is turning into an international business, competition between universities is growing. It is the name behind the university that attracts students and

faculty. It is not any staff or students that universities are concerned about, but only the elite. With the admission of top students, universities are intending to generate top graduates. A university's good reputation helps its graduates in entering the job market. More importantly, top graduates from top universities will not just be working for any companies, but only for the most lucrative ones. (Brown, Lauder and Ashton, 2008: 13)

Recent German reforms in higher education are a good example for the growing competition among universities. In the past, students and companies in Germany did not differentiate highly between university degrees of different institutions. Nowadays "excellence reforms" have resulted in a shift of focus towards a few first-class universities. These reforms were put into place in order to make German universities more competitive on an international level. By doing so, the majority of German universities are being increasingly neglected while the tracks towards a "new elite" are laid down. (Brown, Lauder and Ashton, 2008: 13)

The further development of German universities can be predicted easily, as it will be following the international pattern. Students will be pigeonholed, depending on their alma mater. Companies are likely to only hire promising students, that is to say, students from the elite universities, since it is particularly hard to be accepted at these universities and, consequently, these students must be particularly smart. This development ultimately results in a "war for talent", leaving a growing income gap between the students of German universities. The answer to the question why this "war for talent" has emerged exactly now that higher education is expanding worldwide is closely linked to the global skills race that was introduced in Chapter 1. (Brown, Lauder and Ashton, 2008: 13)

5. THE CHINESE PERSPECTIVE

5.1. WHAT DOES 'KNOWLEDGE ECONOMY' MEAN FOR CHINA?

As was mentioned in greater detail earlier on, knowledge has taken on a significant role in the global economy. This is also the case in China. With the evolution of the knowledge economy China has faced eminent economic growth. (Sheehan, 1999)

A period of continuing remarkable economic growth has taken place in China since the late 1970s. Over the last decades China's GDP has seen an average growth of over 9%. Nowadays China's economy is the 4th strongest after the United States, Japan, and Germany. According to the OECD (2005: 12) the trend of higher incomes and reduced poverty can be depicted easily. In absolute numbers the amount of people living in poverty in rural China fell from 250 to only 26.1 million in the years between 1978 and 2004. (Zeng and Wang, 2007: 3)

Consider the early years of this development; in the two decades between 1978 and 1998 per capita GDP in China averaged an annual growth of about 8%. When in the late 1970s China's per capita GDP accounted for only about 9% of per capita GDP of major European economies, 20 years later this percentage has risen to about 20%. For this reason, in the late 1990s economists around the world believed that China would catch up with the Western World similarly to catch-ups other countries have managed in the past. (Sheehan, 1999: 1)

There have been some successful cases of these "economic catch-ups". Consider for example how the United States levelled with the UK and Europe in the late 19th century. Or how, later, Japan's economy soared in the years after the Second World War, achieving an economic level similar to that of the United States. On top of that, most recently, Asian NICs showed the world in the late 1960s that they could keep up with Japan and even with the United States. (Sheehan, 1999: 1)

However, China is in a very different position to the cases mentioned above. When Japan, for example, managed to catch up with the West, the world was in an industrial age. Nowadays, the global knowledge economy and China's ability to succeed in a highly skilled economy will decide about China's fate as a developed country. (Sheehan, 1999:

1)

Zeng and Wang (2007: 3) argue that growth in China has, for the biggest part, been because of "a set of market-oriented institutional reforms, strong investment, and effective adoption and application of various knowledge and technologies". Be aware that with the accomplishments that have taken place in China's recent history there have also been some notable obstacles along the way. In the course of this chapter the reader will be familiarized with the ups and downs of China's path towards a knowledge economy, with higher education being at the center of attention.

5.2. CHINA'S ASSETS IN EDUCATION

As the term knowledge already indicates, a highly skilled and educated population is essential to a well-functioning knowledge economy. By equipping its labor force with good education China has made some right movements in order to strengthen its economy. (Zeng and Wang, 2007: 7)

As early as in 1979 a number of reforms of China's educational system have been put into place. With some essential improvements it has been possible to ensure that a majority of the Chinese population receive an education. Starting in 1979, it took about 15 years to raise literacy levels among adults from 64% to 89%. (Zeng and Wang, 2007: 8)

With the improvement of all levels of education in China the need for higher education was growing very quickly. At a certain point the state alone could not provide higher education to a sufficient degree any more. That was where private entities stepped in. Ever since, private higher education has been of a rising popularity, especially in business related fields and the IT. This stems from the fact that private institutions are "more market-driven and generally better equipped to fulfill the needs of business". Thus, they are ensuring high quality higher education. Currently, private education is still on the preliminaries making up only about 10% of total university enrollments in China. With household savings estimated as high as 60 trillion RMB and the historical importance of good education in China it is very likely for private education to play an even bigger part in the future. (Zeng and Wang, 2007: 8)

5.3. CHINA'S FLAWS IN EDUCATION

Undoubtedly, China has ensured a number of victories in various aspects of the knowledge economy. Nevertheless, China needs to come eye to eye with a myriad of obstacles and there are blemishes that need to be overhauled on the way to becoming successful as a knowledge economy. (Zeng and Wang, 2007: 16)

One of the weaknesses China is facing is the lack of education in general. On the one hand, China's population enjoyed a profound amelioration of education in the last decades. On the other hand, in contrast to OECD countries, the education provided to the public in China is still at an inadequate level. (Zeng and Wang, 2007: 19-20)

A second point illustrating the troubles China is facing on its way to becoming a prosperous knowledge economy is the lack of quality in higher education. Moreover, often-times the higher education that is provided in China only corresponds poorly to the markets' demands. Because of the recent support of higher education in China one could observe a fast growth of university enrollments. In the time between 1990 and 2004 the enrollment ratio rose from 3.4% to 19%. Nevertheless, the issue at hand is that quantity does not equal quality of education. As schools in China are following a rather strictly academic curriculum one can easily assess that education in China is losing touch with the requirements of the market. In fact, between 2002 and 2005 approximately a third of university graduates had problems finding work. (Zeng and Wang, 2007: 20-21)

The McKinsey Global Institute (2005a) has found out that this is in part because Chinese students concentrate too much on the theory while lacking practice, for example, in teamwork. According to the same study the ultimate consequence was that less than 10% of Chinese graduates found a job in foreign companies. (Zeng and Wang, 2007: 21)

The last weakness deserving to be mentioned is that Chinese education is lacking quality control. In the prevailing system opinions of parents, society, and industry tend to be neglected. Hence, objective opinions are hard to come across. Furthermore, since there is no vocational qualification system in China, skills assessment and transfer of credits are becoming increasingly inadequate. (Zeng and Wang, 2007: 21)

5.4. LATE REFORMS OF CHINA'S HIGHER EDUCATION SYSTEM

The two five-year plans in China of 2001-2005 and 2006-2010 include an increase in quality as well as the creation of knowledge and intellectual property in order to ensure economic progress. With the plans set out in this way they promise a modification of the administration and a significant contribution to higher education. Comparing the actions of China at its current level of development to the actions of other nations in similar states of development it becomes strikingly obvious that while others first and foremost back primary and secondary education, China falls out of the pattern with its target on higher education. (Li et al., 2008: 2-3)

> The number of undergraduate and graduate students in China has been [growing] at approximately 30% per year since 1999, and the number of graduates at all levels of higher education in China has approximately quadrupled in the last 6 years. The size of entering classes of new students and total student enrollments have risen even faster, and have approximately quintupled. Prior to 1999 increases in these areas were much smaller. (Li et al., 2008: 3)

Yet, the most part of expenditures on higher education is spent on elite universities. Besides, contracts for academic staff have faced tremendous changes from earlier versions away from tenure and a minimum publication limit. These modifications have significantly influenced China's higher education landscape. The reverberations can, in fact, even be observed on an international level. (Li et al., 2008: 3)

Li et al. (2008: 3) state that the skilled workforce of the People's Republic of China accounts for about 40% of all OECD countries and is supposed to become even more influential in the future. As a consequence, with the rising importance of knowledge, the world economy will face a multitude of important changes in the trade of ideas and related products in the coming years.

5.4.1. RAPIDLY GROWING NUMBERS OF ENROLLMENT

Starting in 1999, higher education in China has been the subject of a number of influential revisions. Nonetheless, these revisions have, for the largest part, not been documented well in accessible research. Regardless, as China is a significant part of the world's economy, with about 1.3 billion inhabitants, any important revisions of higher

education do not just prove to be of a large impact for the Chinese economy itself, but for the global economy as a whole. (Li et al., 2008: 5)

In the time between 1999 and 2005 the number of students – undergraduate and graduate level combined – increased fourfold. Before that, the number of university graduates and the number of students enlisting at university was almost at a constant level. When in 1998 there was a total of 830,000 university graduates, by 2005 the number had risen to 3,068,000 which is 3.7 times as much as in 1998. When comparing the number of students enlisting at university, the gap between 1998 and 2005 is even bigger. In the given timespan the number has almost increased fivefold, to be exact, the total number of students enlisting at university has grown by a factor of 4.6. (Li et al., 2008: 5)

5.4.2. A PLENTITUDE OF SCIENCE STUDENTS

Scientific and engineering subjects in particular have seen a strong increase of enrollments. Li et al. (2008: 6) predicted that Chinese scientists and engineers with a Ph.D. would have outnumbered their counterparts from the US by 2010.

To underline the significance of science subjects in China consider the following example, which Li et al. give in reference to available data provided by Herbold (2006 cited in Li et al., 2008: 6). Of all 24-year-old students who held a Bachelor's degree in 2001, in the US only 5% held an engineering degree. What is more, in China as many as 39% of students fulfilling the same requirements had pursued an engineering degree. In other Asian countries like Japan, South Korea, or Taiwan the percentage of students with engineering degrees is lower than in China, but still reaches a respectable 19% or more.

5.4.3. RAPID DEVELOPMENTS OF HIGHER EDUCATION IN RURAL AND URBAN AREAS

The modifications of China's higher education system have triggered certain positive changes. As a matter of fact, it has become increasingly easier for families of rural areas to send their children off to attain higher education. Consequently, the vast educational differences between countryside and cities are slowly starting to get smaller. (Li et al., 2008: 8)

Another example given by Li et al. (2008: 8) is relying on data provided by the National Science Board (2006). According to this source, in 2003 five out of one hundred Chinese citizens at the age of 24 held a university degree. About 20 years ago, in the middle of the 1990s, approximately one out of three high school students in urban areas would be able to enter university. Li et al. further argue that data from the "Educational Statistical Yearbook of China" suggest that in 2005 this ratio has risen to one out of two high school students.

Available data, which can be found in Table 2 as part of the appendix, suggest that for students from both urban and rural areas admittance has increased significantly. Moreover, relatively speaking, the amount of students from urban areas enrolling at universities is dropping in comparison to total admittances. (Li et al.: 9)

Additionally, judging from data provided by the National Bureau of Statistics of China, Li et al. (2008: 8-9) argue that "Admission rates for the population in rural areas [have] risen much faster than admission rates for the urban population". The reader is kindly asked to refer to Table 3 in the appendix for greater details in this respect.

Nevertheless, Chinese higher education remains, to a great extent, reserved for the urban population. Anyhow, the focus of Chinese policies is more and more shifting towards "social harmony". As a result, the educational future of the rural population might possibly turn out to be more promising than the present. (Li et al., 2008: 9)

5.4.4. SHIFTING THE FOCUS FROM QUANTITY TO QUALITY OF EDUCATION

The trend away from quantity towards quality has been spurred by the modifications of the Chinese higher education system. Strict quantity indices have been introduced in order to enhance the quality of universities. (Li et al., 2008: 12)

Meanwhile, the objective of investments has become more than an attempt to raise the number of university students. Higher education institutions face the strain of being able to compete as their performance is assessed in impartial rankings. The rankings put universities under a lot of pressure, especially since their outcomes are heavily influencing investments. However, the growing importance of quality in education appears to be of a voluntary nature that is only sped up by policies. As is common

practice internationally, Chinese universities have recently found themselves in a place where they have to fulfill a quota of publications in renowned scientific journals. In consequence, to earn and keep a position as a member of staff highly depends on one's publications. Indices of quality of institutions are determined by the publications of articles, citations, and not least the global rankings. These indices are then used to permanently evaluate the work of the staff at Chinese universities, thus distinguishing the system from common international non-recurring tenure practices. A likely criterion for a member of faculty is to achieve three publications in international journals per year. The consequence for not reaching this goal is quite often the expiry of their contracts. Apart from the goals that the staff has to reach there are some additional general goals for the universities. These strict rules for quality improvement for the universities, staff, and students have had a tremendous impact on the Chinese higher education system. In the time between 1998 and 2003 the number of articles on engineering and science topics rose from 14.54% to 22.43%, which corresponds to an increase of 9%. (Li et al., 2008: 12)

To a great extent the focus of earning higher education degrees in China lies mainly on purely academic fields like sciences. Business and social sciences are also on the rise, whereas the arts are still of minor importance. Compared to OECD countries vocational training for employment in hands-on fields like working as electricians, carpenters etc. is being sponsored relatively poorly although, admittedly, there has been a slight increase of vocational trainings in recent years. Li et al. point out that "So far, there is limited professional certification for trades in China and the focus on vocational training has been on professions -- doctors, nurses, lawyers, dentists and others." (2008: 12-13)

One must not forget that after all, changes of quality as well as of quantity can be witnessed at the same time. In addition, the rise of the amount of total students in China of more than 30% annually is greater than China's economic progress. (Li et al., 2008: 13)

5.4.5. EMPIRICAL EVIDENCE FOR THE CHANGES OF CHINESE EDUCATIONAL POLICIES

Given the magnitude and profoundness of the changes in the higher education system in China since 1999, it seems quite unusual that the accessible information about these

changes and their results is rather scarce. With the documentation at hand it was possible to get tangible figures for the number of students enrolling at and graduating from university, ordered by their fields of study and their universities. The fields of study are divided into four main classes, i.e. "sciences (physics, chemistry, engineering, computer science and related fields), social sciences (including economics, political science, psychology and other disciplines), business and business related studies, and also professions, including doctors, nurses, and lawyers." (Li et al., 2008: 13)

Taking part in higher education brings high individual costs for families in China, especially in fields like business. Anyhow, receiving higher education is viewed as very important. Individuals conceive the rewards of higher education, in respect to advancing on the social ladder and better earnings, to be highly significant. It is often argued that inequalities of educational attainment trigger social disparities. The social gap that widens in this way gives the Chinese people reason to worry, especially, when considering the recently quickly growing imbalance in earnings and social status. (Li et al., 2008: 13)

Apparently a great number of the population, both rural and urban, are bringing up much of their income for school related activities like tutoring, so their children can attend promising education. (Li et al., 2008: 13-14)

The Chinese Academy of Social Sciences (2005 cited in Li et al., 2008: 14) found out that expenses for children's education is the number one consumption cause among the Chinese population, ranking above household expenses and retirement payments. In the time between 1996 and 2003 there has been a growth in expenses on tuition and similar expenditures per capita net earnings from 16.6% to 33.2%, according to Peng and Chen (2007 cited in Li et al., 2008: 14). Apart from these monetary expenses there is also the parents' time expenditure.

According to the Xinhua News Agency (2007), the Chinese Youth and Children Research states that 6-year-old children in China spend on average 8.6 hours at school. Some of these children spend up to twelve hours at school per day. An interesting juxtaposition concluded that most students devoted more of their time to school than their respective parents devoted to their jobs. Above mentioned particularities of the Chinese educational system are causing education to be highly interwoven with society and the

economy. (Li et al., 2008: 14)

5.5. CONSEQUENCES FOR THE INTERNATIONAL ECONOMY

Since China's population accounts for a large part of the world's population it is only legitimate that the transformations of its educational system have significant impacts on the international economy and educational system. (Li et al., 2008: 37)

Obviously, attaining education is highly linked to the job market. This correlation can be underlined by the growing importance of products that were produced using highly skilled labor. In the past, China's exported goods tended to focus on low-skill goods; with the growing number of university graduates the supply of products from high skill labor is rising. (Li et al., 2008: 37)

Li et al (2008: 37-38) conclude that China's university graduates account for a considerable share of the world's university graduates. China's yield of university students has been rising sharply after the changes in educational policies of 1999. All in all, China's output of university graduates is expanding faster than that of the OECD member states.

The strict immigration laws of OECD countries make it impossible for many well-educated Chinese laborers to leave China. In any case, globalization has had the effect of simplifying the mobility of economic endeavors within the OECD. With the help of outsourcing this effect has been brought to China as well. As a consequence, the changes in China's educational policies have a growing impact on the "global location of productivities". (Li et al., 2008: 38)

Starting in the 1990s particularly the production of electronic products of the US has been outsourced. In the beginning, the meaning of outsourcing was to make new deals with production suppliers. In most cases it took place overseas, particularly in China. Nowadays the majority of electronic supplies are produced in China with an increasing importance of outsourcing in this field. (Donahoe, 2003, cited in Li et al., 2008: 38)

Further fields influenced by China's transformation of education are the international trade and the creation of knowledge intensive goods. In the past, China's position in the world's economy was either at the receiving end of FDIs or constrained to trading

products as well as services. Nonetheless, with the growing importance of knowledge China's attention has shifted to patents within China and abroad. (Li et al., 2008: 43)

5.6. RECAPITULATION

Considering the results of this section the reader should have gotten some insights into the transformation of educational policies in China starting in 1999, especially in higher education. The reforms were examined with a particular focus on the impacts they had and have on China's economic development and the international economy as a whole. The peculiarity of the Chinese case is that the aim of these reforms was primarily higher education. Hence, China has set an example for other less-developed countries which so far have mainly focused on changing primary and secondary education to achieve growth of their respective economies. Moreover, there is no other nation of comparable size and economic progress, which makes the example of China ever more interesting. (Li et al., 2008: 44-45)

Of course, the changes in educational policies in China since 1999 are still very fresh. They might have influence on the international educational system and economy, let alone on China itself, that cannot be assessed as of now. Obviously, this calls for the conclusion that education in China is, in fact, becoming more and more influential for the international economy especially for matters of knowledge transfer in increasingly competing settings. Even though research is lacking conclusive results China's educational policies will prove to be of great importance for China to keep up with global economic standards. (Li et al., 2008: 45)

6. THE EUROPEAN PERSPECTIVE

6.1. WHY IS HIGHER EDUCATION SO IMPORTANT FOR EUROPE?

Hoareau, Ritzen and Marconi (2012: 4) mention a significant connection between university education and the state of the economy in their research. Obviously, a good university system is the backbone of a well-functioning knowledge economy and, hence, of the modern economy as a whole.

The financial crisis hit Europe hard. According to Garben, higher education can help lay the stones leading Europe out of its prevailing economic troubles. To invest in higher education means to invest in the entire economy. Therefore, supporting universities is inevitable in today's world. With the help of a strong knowledge economy, economy as well as society, can recuperate from the devastating shocks of the crisis. (2012: 1)

Some firm believers like Hanappi (2012: 24) argue that in order for Europe to stay a strong player in the international market the "intellectual equipment of European voters" needs to be promoted. At the same time, Olsen and Maassen (2006: 3) claim that Europe has not yet managed to "meet the fast growing demand for higher-level skills and competencies, and research-based commercial technologies".

That is to say, if Europe wants to secure its position as pioneer of the future global knowledge economy it is high time for European policy makers to start focusing on universities and their needs. Needless to say, a great number of sensible reforms of the European university system will need to be put in place. If Europe misses to get a grip on its universities it will not only have difficulties competing with already existing knowledge-super-powers like the US, but also with emerging players like India and, of course, China. (Olsen and Maassen, 2006: 3)

The good news is that in recent years the importance of higher education seems to have been understood. The EU set it as its goal to reinforce this vital line in order to compete successfully in today's innovative market. This aim has been defined in the Europe 2020 strategy. (Hoareau, Ritzen and Marconi, 2012: 7)

6.2. INTRODUCING HIGHER EDUCATION IN EUROPE TO THE 21ST CENTURY

Universities in Europe need to fulfill a number of tasks in order to guarantee a well-functioning knowledge society. The key chores Europe needs to tackle include research and teaching, as well as distributing knowledge within society. Universities find themselves juggling with these three highly interrelated responsibilities. (Veugelers and van der Ploeg, 2008: 2)

Europe's place within international surroundings is among the leading powers of modern technological accomplishments. The times of lagging behind other major players have long been gone making room for highly skilled and creative minds who are needed to steer Europe into a prosperous future. Veugelers and van der Ploeg claim that universities will be largely responsible for leading Europe towards a place where it will be "the most competitive economy and knowledge-based society of the 21st century". (2008: 2)

The world is facing a global economy where the role of knowledge is becoming more and more important. Thus, the European university system inevitably has to be updated in order to be able to compete in this knowledge-intensive world. The changes that will take Europe there will have to include collaboration in the fields of "education, research and innovation". Obviously, there is a plethora of necessary reforms that have to be implemented at EU level and beyond (i.e. in European non-EU member states). Beginning with the Bologna Process some changes have started to fall into place. Nevertheless, in the majority of EU countries such reforms are not on the main policy agenda. The nation states have to realize that giving a greater priority to such reforms is essential for a thriving higher education landscape in Europe. (Veugelers and van der Ploeg, 2008: 2)

Governments tend to rather invest into primary and secondary schooling and presumably rightfully so. Yet, according to Veugelers and van der Ploeg, changing structures of higher education goes beyond "restructuring its governance or pumping more public money into the system." The example of Australia has shown that with the introduction of well-devised social credits private investments in the form of greater tuition fees can be collected. At the same time this approach has managed to circumvent additional entry barriers. (2008: 2)

6.3. ESSENTIAL FACTORS IN DETERMINING A UNIVERSITY'S ACCOMPLISHMENTS

In their article, Veugelers and van der Ploeg (2008: 12) look for explanations of why there are such significant discrepancies in achievements between European universities and those of other nations, like the US. The two most important indicators seem to be investment and administration. However, beside these two major contributors it appears like a country's population is also of a not negligible influence on higher education. A big population has a positive impact on the nation's returns to scale.

According to Alesina and Spolaore (2003: 3), in countries with big populations the per capita costs of public goods are comparably small. On top of that they claim that "the size of a country affects the size of its economy".

Moreover, sheer probability prompts the conclusion that the possibility for the emergence of a brilliant student is higher in larger countries than in countries with fewer inhabitants. This simple result should be incentive enough for European countries to work together in order to be more competitive on a larger scale. (Veugelers and van der Ploeg, 2008: 12)

Even so, Thissen and Ederveen (2006: 40) argue that merely enlarging the scale does not assure higher degrees of competition and quality per se. They stress that, first and foremost, it is the national governments' responsibility to rethink their respective university systems.

Findings across various studies underline that there are two important factors that contribute to a successful university system. First of all, there is the availability of ample money. The second highly important aspect is a university's autonomy from the government. These two parameters are positively correlated. An increase of university funding will be of a higher influence if the university is well-managed, and vice versa. (Aghion et al., 2007: 8)

First, consider the public funding of European universities. The percentage of GDP which is invested into higher education is a commonly used parameter for measurement. In the EU-27 in 2008 only 1.2% of GDP were spent on higher education according to Eurydice.

Take into account that some countries, such as Denmark and Norway invest more than 2% of their GDP in higher education whereas others bring up less than 1% of their GDP for their respective university systems. (2012: 87)

The second point that is often criticized in literature is the lack of autonomy of European universities. Hoareau, Ritzen and Marconi (2012: 8) argue that high levels of autonomy as well as sufficient funding are the key indicators for the effectiveness of a country's university system. Only if universities are granted more autonomy from politics they will be able to achieve optimal results. Olsen and Maasen (2006: 4-5) further claim that governments harm their universities' "adaptability, performance and competitiveness" once they start tampering with them.

A desirable goal for universities is to have a greater degree of autonomy in a number of different fields. Aghion et al. demand that apart from autonomy with their financial plans universities should also be given some space in "hiring, remuneration, course design and student selection, particularly at Master's level". One must not forget that a higher degree of autonomy requires an increased level of assessment of a university's performance. (2007: 8)

6.3.1. CHARACTERIZING AUTONOMY

Neave (2009: 12) raises the question: "[W]hat are the essential functions a university must control if it is to exercise Institutional Autonomy as a genuine rather than as a symbolic condition?"

Referring to the works of German sociologist Stichweh (1994 cited in Neave, 2009: 12-13), Neave names a variety of responsibilities that are inevitable for an institution's autonomy.

According to Stichweh (1994, cited in Nybom, 2008: 135), universities should be able to make decisions on their own account in those areas fully requiring their dedication. Additionally, they should have the rights to have command over their capital, as well as their value system. An institution should be given authority over its institutional standards and administration. Another point that should be left for universities to handle themselves is the admission of students and selection of academic staff. To

decide on their aims and the strategies that will take them there should be another sole responsibility of universities. Obviously, an important function of universities should be to administer cooperation with other parts of the community. Lastly, as a result of complete responsibility, all of the choices from above are entirely at the university's liability.

The basic liberties of academia involve all measurements that are part of the university's environment. Academia is pulling the strings as the planner of internal strategies and aims, as well as of the collaboration with the rest of society. Meanwhile, administration takes on the role of implementing the tasks at hand. (Neave, 2009: 12-13)

6.3.2. ADMINISTERING UNIVERSITIES IN EUROPE

Universities, like other major institutions, are made up of a number of individual agents, in this case scientists and members of faculty. At the end of the last section the roles of administration and staff were introduced. Thereby the university's administration drafts the framework and aims for research, while it is the staff's responsibility to implement these aims and collaborate with society. Veugelers and van der Ploeg call the two key indicators to measure good governance "autonomy and accountability". (2008: 16)

It proves to be a difficult task to distinguish good governance on an international level. In spite of that, Veugelers and van der Ploeg provide some characteristics for autonomy and accountability established by the OECD. The attributes for autonomy include "financial autonomy, staff policy autonomy with respect to hiring/firing and wages, student selection and course content" and in the case of accountability they are "evaluation mechanisms and funding rules". (Veugelers and van der Ploeg, 2008: 16)

Veugelers and van der Ploeg (2008: 16) suggest that the US has the highest degree of autonomy across all sub-categories. Refer to Table 4 in the appendix for better understandability of Veugelers and van der Ploeg's research. In the European case especially Scandinavian countries like Denmark, Finland, and Sweden, but also the UK, possess high levels of autonomy. Regardless, the particular kinds of autonomy vary across these countries. The results on accountability are not quite as uniform. It is easy to conclude that the UK has high scores in both categories of accountability. Countries like Japan and the US show relatively low figures on financial accountability which can

be explained because of the comparably high amount of budget adaptability. Finland, by contrast, scores relatively low on evaluation mechanisms while achieving high on the behalf of financial accountability.

6.4. DRIVING EUROPE'S HIGHER EDUCATION SYSTEM FORWARD

6.4.1. BOOSTING UNIVERSITIES' FINANCES

As technological development is growing unstoppably, the European society is becoming increasingly wealthier. With this growing wealth the rising costs of higher education can be covered. Even so, as technology is simplifying many processes in everyday life, services like research, as well as teaching can only be accomplished by highly skilled individuals and not by machines. (Veugelers and van der Ploeg, 2008: 19)

Universities have to ensure their partners, i.e. partner firms, the government, the general public, and in particular the students that they use the assets at hand in the most effective way possible. Great adjustments have to take place in order to spark a drastic increase in funds. Such adjustments are inevitable in triggering and legitimizing new funding. (Veugelers and van der Ploeg, 2008: 19)

The EU's public funding of higher education draws level and in certain cases indeed overhauls the respective numbers of its international opponents. However, private contributions to higher education in the EU lie under the global average. In order for the EU to be able to compete internationally its focus has to shift towards determining and attracting a greater number of public and private investors. (Veugelers and van der Ploeg, 2008: 20)

As input unavoidably leads to output the same is true for investments in education. The output here can be measured as returns from education for individuals, much the same for the entire society. Momentarily disregarding the necessity of public funding, it is the particular kind of investment that is of utter importance. Veugelers and van der Ploeg argue that public investments can be spent in three different ways: on "core, competitive and outcome-based" features of higher education and research. Financing should take place according to performance degrees as characterized by distinct goals. Global reference points for inputs and outputs on a social and economic level have further

influence on above mentioned performance degrees. (2008: 20)

In Chapter 8, the present situation of financing European higher education is discussed in greater detail and possible policy suggestions are presented.

6.4.2. ENHANCING ADMINISTRATION

Finding a generally valid connection between administration and outcome can prove to be a difficult task. Moreover, it is most likely that there is no single best way to measure this relationship. Consequently, a uniform pattern to administer universities on a small-scale level should be avoided in European educational policies. (Veugelers and van der Ploeg, 2008: 21)

One can easily pinpoint the three most important players concerning university self-governance. On the one hand, universities should be empowered to make their own decisions in various matters. On the other hand, society as a strong counterpart follows its own intentions, thus, trying to impose its curriculum on the universities. These curricula most commonly include the syllabus and the admission of students. The third player is, of course, the government. The possibility to tamper with educational issues can seem tremendously tempting for the government. Yet, its main focus should lie on tending to the variety of educational facilities and encourage trial and error. As was mentioned before, a university's self-governance is of utmost importance. (Veugelers and van der Ploeg, 2008: 21)

One must not forget that it would not be entirely right to demand the government to stay out of the universities' affairs altogether. On the contrary, governmental forces can specify a broad set of standards, investment strategies, and goals for policy, as well as for academic interests. With this effort they can achieve policies of their own, with particularities and frameworks that fit into their various purlieus. (Veugelers and van der Ploeg, 2008: 21)

In the meantime, several nations have managed to implement financial autonomy to a great extent. Nevertheless, decisions concerning staff are ever so much an object of rigid laws. Particularly in continental Europe resolutions on wage and appointments of staff are under strict confinement. These restrictions make it difficult for universities to get to

a place where they get a chance to advance. The only way out of this deadlock is to grant universities "real autonomy on pivotal instruments." (Veugelers and van der Ploeg, 2008: 21)

Needless to say, with growing independence from the state, universities will have to assume greater responsibility for their actions in front of society. This implies that current structures of administration need to be thrown overboard. For the government this means fewer possibilities to intervene while at the same time resulting in greater responsibilities for universities, especially concerning the topics of "quality, efficiency and the achievement of agreed objectives". (Veugelers and van der Ploeg, 2008: 21)

This new approach calls for the development of different governance structures within universities. The foundation of such structures should lie heavily on administrative features, such as the human resources, financing, and strategic goals. Especially the human resources, i.e. administering the staff, are a crucial scope since they are an essential part in establishing the excellence of academia. As a matter of fact, it should be a pivotal interest of universities to improve their human resources. This can be achieved through engaging a greater number of talented staff for academic jobs while at the same time encouraging excellent staff to keep working for the university. First-rate outcomes can only be achieved in a workplace that encourages translucent and clear operations. (Veugelers and van der Ploeg, 2008: 21)

6.4.3. SUPPORTING COMPETITION BETWEEN UNIVERSITIES

Receiving private and public investments encourages universities to organize their frameworks in completely new ways while at the same time assuming full responsibility for their actions in front of credit-granting entities. Still, across Europe, investments are often times not yet sufficient and structures are oftentimes too stiff. The result is a state where universities are unable to break out of the old system. (Veugelers and van der Ploeg, 2008: 21)

One possibly opportune way to make change happen within these persistent unyielding structures is to open up the European university system to contest. Veugelers and van der Ploeg argue that, as in a variety of fields, competition at university level could shed a more attractive light on European higher education. Creating demanding surroundings

through contests between faculty, as well as between students, will most likely appeal to excellent staff and students, respectively. Undoubtedly, such contests will have to go hand in hand with other changes, e.g. an increase of students' and staffs' ability to move, and renewed distribution of assets. Besides, competition across universities needs to be a global instrument if it is to produce satisfying results. If the competition is geographically strictly restrained universities will not feel the need to play at the international level. (2008: 21-22)

Due to the growing range of universities the risk of monopolization has arisen. In their paper Veugelers and van der Ploeg mention the university system in the Netherlands as an example. There, one can easily observe the fast expenditure of monopolization. This example shows crucial bidirectional influences on fixed costs culminating in a significant decrease of resources for staff. Monopolies in the university context share the same negative features of any kind of monopoly. These features include a rise of fixed costs, a decline of quality, and worsening conditions for students and staff. The characteristics of monopolies suggest monopolistic price setting which leads to an increase of tuition fees in the case of higher education. At the same time deteriorating conditions for both quality and quantity of education can be observed, particularly given a low "price elasticity of demand". (2008: 22)

A growing contest among universities has contributed to lifting the borders that higher education within Europe has been facing for centuries. Thanks to the growing contest the creation of an enormous unified higher education market can be witnessed across Europe. With a strong backbone like this, European universities are empowered to use their relative superiority and become major players in the global higher education market. (Veugelers and van der Ploeg, 2008: 22)

7. CHALLENGES FOR HIGHER EDUCATION IN 21ST-CENTURY-CHINA

> The goals of China's tertiary education are preparing students for various professions and trades, promoting their well-rounded development, and contributing to the social, cultural, political, economic, and scientific-technological development of the society. At the national level, tertiary education shall implement the state strategy of reinvigorating the country through science and education and enhance workers' quality, so as to meet the need of socialist modernisation. Specifically, the goals can be explained as promoting the spiritual, moral, and intellectual development of the Chinese people; cultivating high-level talents with innovative spirit and hands-on capability; and providing sufficient human capital and intellectual support for the modernisation process and the construction of national innovative knowledge system. (OECD, 2007: 10)

In the case of China, apart from formal institutes of higher education, the term higher education includes adult higher education, vocational training and preparation programs for college degree tests for self-reliant students, as well as distance and internet-based learning. In the further course, this chapter will be focusing on the formal institutes of higher education, which accounted for a total of 1,731 institutes in the year 2004. Two hundred twenty-six of these were private institutes, while the rest were split among the central Ministry of Education (73 institutes) and other central ministries (38 institutes). The remaining 1,394 were local institutes under the administration of governmental bodies of provinces, municipalities, and autonomous regions. (OECD, 2009a: 33-34)

Of the higher education institutions around 60% had short-cycle or similar programs lower than Bachelor level, and at the same time 26% of the institutes had postgraduate programs. Moreover, another 315 research institutes also held postgraduate programs. Apart from these formal institutes, a total of 505 non-formal institutes for adult higher education existed in 2004, and another 1,187 non-formal institutes of higher education were private. Over 300 of these private institutes had some connection with public universities. What is more, the institutes for adult higher education slowly became a part of the formal institutes of higher education. For this reason, there number shows a fall from 1,156 in 1995 to only 481 in the year 2005. Additionally, 67 formal institutes of higher education may offer internet-based education. The reader is kindly asked to refer

to Table 5 and Table 6 as part of the appendix for further information on Chinese higher education. (OECD, 2009a: 34)

Many steps have been taken for higher education in China in the last years. Nowadays, around a quarter of all students around the world are studying in China. Remarkably enough, at the same time only 2% of the global budget for education is used here. Therefore, it seems as if the education system in China works rather effectively. The unification of various universities in the course of the last decade has had positive repercussions on this cost effectiveness. Another benefit of this unification was that it caused the distribution of high quality resources among departments, universities, and even provinces. (OECD, 2009a: 40)

In order to get a better insight into the late developments of higher education in China, consider following statistics. The number of students enrolled at formal institutes of higher education has risen from 2.9 million in 1995 to 13.3 million in 2004. By comparison, total higher education as defined above, marked an increase of enrollments from 5 million to 23 million. While historically less than 10% of 18-22 year olds participated in education, this number now even exceeds 20%. A particularly noteworthy development is that an increase in participation can be noted for women, students with minority backgrounds, and from rural upbringings. In 1995 the number of higher institutes of education totaled 1,054; by 2004 it had reached 1,731. In 1995 there were only 20 private institutes of higher education, by 2004 the respective number had increased to 226. Moreover, studying abroad was heavily fostered by the Chinese government. Eventually, 20 000 Chinese citizens return each year after having studied and graduated abroad. Also, research and communications infrastructure received a vast increase of funding. (OECD, 2009a: 40)

7.1. QUALITY

Not without reason has the issue of the quality of higher education been discussed earlier. According to the OECD, quality is fundamental in higher education, and even politics and society recognize its value. As was discussed in Chapter 6, beginning with the late 1990s, China's politics have started to focus on undertaking several actions. These policy changes were supposed to tackle the difficulties that ensuring quality in higher education brings, especially in the face of the ever growing numbers of

admissions. The measures undertaken included an expansion of opportunities for higher education, covering the demands that society holds in store for higher education, and, obviously, the guarantee and enhancement of the quality of education. Over the course of the time, China managed to come up with a "quality assurance and assessment system for regular tertiary education, adult tertiary higher education and graduate education." (2007: 71)

7.1.1. MEASURES OF QUALITY ASSURANCE

According to the OECD (2007: 71) maintaining and fostering quality in higher education requires the assurance of educational conditions, the backing of related agencies to perform educational evaluations, and the bolstering of policy advice at the macro level. The Ministry of Education published the "Suggestions on Strengthening Undergraduate Education and Improving Its Quality in Regular Higher Education Institutions". This proposal, including the imposing of evaluation on teaching performance, the employment of high-quality resources for teaching, and monetary guidance, is meant to guarantee the quality of higher education.

To round off these propositions, the "Project for Reforming Teaching Practice and Enhancing the Teaching Quality in Higher Education Institutions" was put into action in 2003. Obviously, quality is in the center of this project, which includes following standards. The framework of the curriculum, as well as the teaching subjects and practices are to be reinforced. While the quality of teaching of basics is to be enhanced, exceptional educators are to be honored. In order to achieve higher quality it is further necessary to satisfactorily equip educational laboratories. (OECD, 2007: 71-72)

Next, the State Council favored the Ministry of Education's 2003-2007 "Action Plan for Invigorating Education" in 2004. This plan mainly includes regulations on the quality assurance, assessment, and standardization of higher education. In China measures of quality assurance and assessment in higher education are mostly conducted by the higher education institutions themselves, governmental forces, and social institutions. In order to fulfill these requisites the Ministry of Education established the "National Assessment Centre of Instructional Performance in Higher Education Institutions". This organization is entrusted with a supervising position, in which it evaluates the

performance of higher education institutions, as well as certain curriculums and fields. (OECD, 2007: 72)

A joint initiative was established in January 2007 by the Ministry of Finance, Ministry of Education, and the State Council under the name "Suggestions Concerning Implementing the Project of Teaching Quality and Teaching Reform of Regular Programmes within TEIs [tertiary education institutions]". In the course of this initiative, the "Quality Enhancement Project" took place. In the five year period between 2005 and 2010 it was subsidized with RMB 2.5 billion. Its focus lies on enhancing teaching quality and revolutionizing the teaching of undergraduate programs at the university level. (OECD, 2009a: 66)

7.1.2. QUALITY EVALUATION OF RESEARCH AND SUBJECT MATTER

Generally scientific research at institutes of higher education is evaluated by professionals of a research project's host institution. Under certain conditions the evaluation may be passed on to suitable companies. An example of such a company responsible for evaluating research in philosophy and the social sciences is the "National Planning Leading Group of Philosophy and Social Science". For the natural sciences and for technological fields, the "National Natural Science Foundation of China" and the "Ministry of Science and Technology" are the respective relevant organizations. (OECD, 2007: 75-76)

Starting in late 2000 "The Institute for the Assessment of Degree and Graduate Education in Higher Education Institutions and Scientific Research Institutes" was appointed with the task of evaluation of academic fields of study. The evaluation involves the gathering of objective information and inspecting the academic prominence. Specialists of the field determine the academic prominence through surveys. Depending on the evaluation criteria of a certain field, survey results and the gathered objective information are subjected to certain transformation. For instance, linear transformation might be applied to the objective information in order to retrieve the scores of the respective indicators of a particular discipline. The results of such transformations are further linked to the outcomes of academic prominence surveys. Finally, weighted means are applied to ultimately obtain an overall score for a particular

academic field. Further, rankings are calculated by using the overall scores of the academic fields. (OECD, 2007: 76)

7.1.3. ENHANCING THE EFFICIENCY OF LEARNING

As has been mentioned before, the Chinese government puts a lot of weight on enhancing teaching and performance. Yet, especially when considering performance, one is quickly confronted with the issue of a great variety in higher education and the resulting high discrepancy of performance. Some institutes of higher education have started to modernize their means of teaching, curricula, and most importantly the assessment of their students' learning performance. Nevertheless, a multitude of other universities have not implemented such changes, yet. Therefore, it remains a difficult task to improve performance across the entire university system. (OECD, 2009a: 67)

Apparently, China is trying to move its higher education away from the established knowledge-oriented approach towards a capability-oriented one. This development calls for an increased employment of cross-disciplinary teaching and learning. Without being mistaken, implementing such changes is not a simple task. However, it is a necessary task, what with considering what happened in Japan, where the insufficient degree of domestic innovative competencies was partly responsible for the halt of the economic growth. Traditionally, the character-based Chinese language was, as was Japanese, taught to be memorized by heart at an early age. Thus, all teaching practices were resorting to means of learning by repetition and memorization. In any case, an approach like this that was using as little imagination and coherent thinking as this one was bound to suppress the learner's creativity. Furthermore, with the heritage of Confucian teachings of respect, not to scrutinize means of teaching and learning might be contributing to the lack of critical thinking. In a nutshell, in order for China not to make the same mistakes that Japan made, it is essential "to develop complementary ways and means of learning to that of the classroom". (OECD, 2009a: 67)

While a number of universities are applying methods of learning which include team-work, simulations, case studies, and hands-on learning, most institutes of higher education are still employing traditional means of teaching. That is to say the prevalent forms of reciting teaching are only supporting the passive role of students. Thereby, the students are essentially forced to study by heart for their examinations, which are

mainly closed-book written exams. Still, one must not forget that the area of study highly impacts learning patterns. For instance, professional education will generally involve more hands-on learning. (OECD, 2009a: 67-68)

Naturally, different universities equip their students with different skills of critical thinking, problem solving, learning techniques, and the utilization of their knowledge. Learning methods have a vast impact on the competencies of a university's graduates. Unease regarding the quality of university graduates has been voiced frequently. (OECD, 2009a: 68)

Many Chinese employers express a strong preference for hiring university graduates from overseas, as opposed to domestic graduates. The OECD refers to a study conducted by the Australian Education International (2006). According to this study, the main reason for this preference is that employers believe that graduates from overseas have a better command of the English language than Chinese graduates do. Another important aspect for employers in the hiring process is better communication and arbitrating skills of graduates from abroad. The third reason for employers preferring overseas graduates is the lack of creativity and innovation of Chinese students. A little more than half (56%) of the questioned employers stated that they would rather entrust overseas graduates with managerial posts, while at the same time having Chinese graduates work in administration, maintenance, and the like. (OECD, 2009a: 68)

Another survey mentioned by the OECD (2009a: 68) that was initially issued by the McKinsey Global Institute (2005b) supported the findings from above. According to this study, multinational companies where faced with a lack of sufficiently educated Chinese graduates bearing desirable skills.

7.2. EQUALITY

7.2.1. EQUALITY OF ADMISSIONS

In general students are eligible for admission after passing the national entrance exams, alongside possible further selection criteria. The state sets up individual admissions for particular fields of study. OECD (2007: 40-41)

According to the OECD (2007: 41) as part of the higher education admissions, disabled

people, as well as people from ethnic minorities, or with other disadvantages are subject to distinguished admission criteria. Thirteen specialized institutes of higher education focus on the acceptance of students from minorities. Additionally, all institutes of higher education have to admit people from minorities, even if their scores on the exams are below the acceptance score. The OECD (2007: 41) further states that

> For programs and majors such as agriculture, forestry, hydraulic engineering, geology, mineral, oil, navigation, military engineering, etc, in which graduates may have jobs in rural, remote and frontier areas, and for special programs and majors such as military, aviation, public security, state security, arts, sports, etc, special admission policies have been adopted aiming to promote social justice as well as admission equity, and to meet social demands for various types of workers.

Generally speaking, entrance exams and admission were subject to various reforms and have hence adopted more humane ways of examination and admission. A good example of these reforms is the 2001 reform that revoked constraints due to age and marital status. Another instance happened in 2003, when the dates for the exams were shifted from July to June because of more bearable weather conditions. OECD (2007: 41)

7.2.2. INEQUALITY ACROSS REGIONS

Across the various regions in China tremendous disparities in access to education prevail. Even in basic education, high degrees of inequality are present. In the year 2005 almost 745 million people - that corresponds to about 57% of the total population - were living in rural regions. According to the World Bank (2007: 14), for the year 2000 statistics attest that for 100,000 people participation in higher education was 18 times higher for students from urban areas as students from rural communities. In comparison, for secondary education the degree of participation of urban students was fourfold the number of rural students. On average the duration of the education of the rural workforce accounted for 7.3 years, while the respective number for the urban workforce accounted for 10.2 years. (OECD, 2009a: 77)

Considering all these influences, it does not come as a big surprise that according to studies conducted by the World Bank (2001: 44), the "Knowledge Development Indicator" suggests massive discrepancies of knowledge among the various Chinese provinces. For instance, in 1998 Beijing and Shanghai proved to be the most knowledge-

intensive regions across China. The knowledge intensities measured in these cities were 6.1 and 5.3 times as high as the national average, respectively. At the same time the knowledge intensity in the Guizhou province accounted for only 32% of the national average. (OECD, 2009a: 77)

7.2.2. WOMEN IN HIGHER EDUCATION

For a long time China has supported women in higher education. One can observe the implementation of a number of important statutes, which underline that women have equal rights to education. As a consequence, local governments are guaranteeing fair access to higher education for women. These factors have shown extraordinary results in the emancipation of women in higher education. Lately, the amount of women enrolled in higher education has been growing reliably, with the proportions of women and men in higher education being close to equal. Consider, for example the enrollment rates of 2004. In that year, 608,680 women enrolled at institutes of higher education, amounting to 45.65% of overall admission rates; on top of that, over 3,500,000 women study at universities for adults, night schools, or similar institutes of higher education. For means of comparison, in 1996, the ratio of women studying at university level made up for only 36%. A highly positive fact worth noting is that women have long since stopped sticking to traditional fields of study, like languages, medicine, and teacher education. Nevertheless, a particularly high ratio of women can still be witnessed in these particular subjects. However, as of recently, a growing number of women are enrolling in fields that were previously dominated by male audiences, like mathematics and engineering. (OECD, 2007: 47-48; OECD, 2009a: 75)

7.3. RESOURCES

7.3.1. FACULTY

The recent vast growth of students enrolling at undergraduate and short-cycle programs at Chinese universities led to a four-fold increase of admission numbers from 1998 to 2004, with about 4.2 million enrollments in the latter year. More than 20 million students are enrolled at university level, summed up over all institutes of higher education. Evidently, this increase in student numbers consequently led to a large increase of faculty at institutes of higher education. (OECD, 2007: 49)

According to the OECD (2007: 49) by the year 2004, there was a total of 858,000 of faculty working in the entire Chinese higher education system. Examined in contrast to the number of faculty from 1998, i.e. from six years earlier, one can observe a growth of 110.3%. Even though this increase might seem like a lot, in some – especially newly established or applied – fields, universities still lack staff. Above all, the fraction of faculty who have been studying or working at prestigious international universities or have gained real-world working experience is unsatisfactorily low.

Despite the increase of quantity in faculty, its quality should also be increased. Therefore, universities and the Chinese government have introduced several standards for quality improvement of faculty. Amongst these measures was the "Action Plan for Invigorating Education Toward 21st Century" as part of which a "Scholar Development Scheme" was suggested by the Ministry of Education. (OECD, 2007: 50-52)

Besides, starting in 2000 a multitude of institutes of higher education began to implement staff reforms. These consist of "faculty employment system, employment system of administrative staff, institutional post system, and allocation system" and are supposed to develop a staff system, which can adjust easily to the market economy. (OECD, 2007: 52-54)

7.3.2. FINANCES

From 1997 onwards, one could observe a significant growth in Chinese public expenses on higher education. Public funding for higher education totaled RMB 187.37 billion in 2003, which is 4.2 times the amount of 1997. Of these funds, RMB 175.43 billion were invested into regular higher education, while RMB 11.93 went into adult higher education. However, not just public funding faced a vast increase. Average expenditures per student at regular institutes of higher education can be witnessed to have expanded as well. In this respect, average expenditure per student totaled RMB 14,963 in the year 2003, about have as much as a student's average expenditure in 1998. (OECD, 2007: 56)

7.4. INTERNATIONALIZATION

According to available statistics, in 2005 China signed over one thousand international agreements. This number is thirteen times as high as the respective number for 1995.

Moreover, over 170 joint programs enabled 118,000 Chinese students to study abroad and 78,323 students from abroad to study in China. (OECD, 2009a: 103)

The UNESCO (2006: 38) states that on an international level China is the major sending country of university students, making up for about 14% of the total number of students studying abroad.

On top of that, China is turning into a more and more popular place for students to choose for their studies. Originally, China was mainly chosen by students focusing on studying the Chinese language. Of course, in the last years the amount of students studying in China has risen immensely. In 2001 there were 61,000 foreigners with their studies based in China and by 2005 this number had already increased to around 78,000. On top of that, China has put much effort into encouraging the Chinese culture and language abroad, with programs like the "Chinese Bridge Project" or the "Confucius Chinese Colleges". (OECD, 2009a: 104)

The international significance of China as a popular place to spend one's studies cannot be denied. In 2005, of all the students from 179 different countries, most came from other Asian nations, such as South Korea, Japan, Vietnam and Indonesia. This group of students accounted for 76% of the total student body. Apart from students of Asian origin, students from the United States, the Russian Federation, India, France, and Germany choose to study in China. In total, 12% of the student body are made up of European students, 9% are originally from the Americas, 2% from Africa, and only 1% from Oceania. The most popular fields of study of foreign students seem to be the social sciences, where about 71% of foreign students were enrolled. (OECD, 2009a: 105-106)

It seems natural that the reasons for this vast growth of foreign participation in the Chinese university system is – at the very least partly – because of adapting the courses so that they are no longer solely held in Chinese, but also in other languages. This clever switch of policies allows for greater opportunities to obtain scholarships from various governments at local and central levels, Chinese and foreign companies, universities, etc. Due to this broadened elbow room, quality assurance as well as social systems are enhanced, and students have a better chance to find work beyond their university and across regional boarders. (OECD, 2009a: 105)

7.4.1. INTERNATIONALIZATION AFFECTING HIGHER EDUCATION IN CHINA

With economic globalization reaching out to China, its ties with other nations are beginning to strengthen. China's economy is facing increasing adaptions in order to fulfill international guidelines and practices. It goes without saying that higher education in China is also part of this international movement. Therefore, the Chinese government has issued a number of guidelines for its university system. Among these guidelines one can find the suggestion to actively make education more widely available to the rest of the world and support international collaboration and transaction. Obviously, this suggests an effort for China to become friendly with other countries, in order to cooperate in economic as well as cultural matters. Further, acquiring knowledge about sciences and technologies, as well as about educational development, from international partners is encouraged; scholarships from other nations are a possible means to promote these desirable improvements. (OECD, 2007: 76-77)

The OECD (2007: 77) claims that these policy suggestions will entail a plethora of transformations of the concept of higher education, education itself, its autonomy, various academic fields, the curriculum and its design, the student body, and money sources.

Several effects of globalization on higher education can be witnessed. First and foremost these effects include the perceptible increment of openness in higher education. In addition, one can observe a higher degree of diversity in higher education. As far as international exchanges are concerned, increased mobility of highly skilled faculty is taking place. What is more, an increase is also taking place in the amount of bilateral student exchanges. In a nutshell, generally an increase of international collaboration and transactions can easily be seen. (OECD, 2007: 77-78)

7.4.2. POLICIES IN PLACE FOR THE INTERNATIONALIZATION OF HIGHER EDUCATION IN CHINA

The OECD (2007: 78) cites that the Chinese government has laid out several instructions in order to promote the opening of its education system, which "shall serve national education reform and development, national socio-economic development, and state foreign relations and peaceful development." These instructions include "widening

channels, promoting exchanges, setting priorities, and emphasising effectiveness," as well as that "education should be geared to the modernisation drive, the world, and future". Accordingly, the government set up and backed educational collaboration and transactions with more than 170 nations worldwide. A multitude of contracts and implementation strategies concerning bilateral as well as multilateral exchanges were inaugurated.

According to the OECD (2007: 79) China is the country with the most students studying abroad. This development has had a vast impact on various sectors in China, like on education, sciences and technology, cultural transactions, as well as on trade:

> After a rapid growth and several phases of transitions, the government has finally formed the following relevant working principles: "support for overseas study, encouragement for returning, freedom for coming and going." Tangible management measures are as follows: "studying abroad shall be applied by individuals and reviewed by experts, selection processes shall be based on fair competition, the government shall select the best candidates, students and scholars shall sign contracts for study abroad, and the state shall be compensated due to default." After several years of reforms, returnees as percentage of all study abroad learners financially supported by the public fund were raised from 92% in 1997 to above 97% in 2005. The percentage of study abroad returnees has increased greatly.

Apart from sending Chinese students to study abroad, China has made serious attempts to attract foreign students to study in China. A particular organization fostering the influx of foreign students is the "Study Abroad Foundation of China", which grants scholarships to students from more than 150 nations, depending on agreed upon exchange contracts. (OECD, 2007: 79)

Most importantly, the advertising of the Chinese language has come into focus for the Chinese government. Undoubtedly, the international market calls for a large pool of people with knowledge of the Chinese language. Universities are one of the main tools for offering foreign students a sound opportunity to immerse themselves in the language. Currently, there is only one standardized language proficiency test, the "Chinese Proficiency Test (HSK)", which is used for objectively determining the knowledge of the Chinese language of non-native speakers. (OECD, 2007: 80)

7.5. CHALLENGES AND PREDICTIONS

7.5.1. PROBLEMS

The OECD (2007: 83) gives three features in order to assess the advantages and disadvantages of higher education policy in China. These are monetary input, equity, and quality.

Concerning the monetary input, it can be said that the vast difference between funding and expenses needs to be acknowledged, resulting in China failing with respect to total educational funds. While in 1993 the Chinese government promised an increase of public expenditure on education of 4% of GDP by 2000. It did not come through with that promise. It goes without saying that the total shortcoming of education funds is reason for the lack of funds for higher education, which is further cause of the insufficient quality of higher education. (OECD, 2007: 84)

The issue of equity of higher education is considered in light of vast gaps in regional development, and the large differences of income between the various social classes. The inequity can be observed particularly well between rural and urban regions. Hence, students coming from rural parts of China face restricted conditions when it comes to applying to universities. Additionally, their monetary reserves and job possibilities are far less pronounced than those of students from urban households. (OECD, 2007: 84)

The educational framework faces some important transformations, when its aim is to be a functioning part of the labor market and the economy as a whole, especially given China's history of command economy and its severe impacts on higher education. The OECD claims that in order to guarantee quality in higher education it is important to foster "[s]tudents' innovative spirits, hands-on ability, professional qualifications, and entrepreneurial capability". Moreover, the fast growth of enrollments at Chinese institutes of higher education has caused some serious problems of quality. (2007: 84)

7.5.2. PROSPECTS

The OECD (2007: 84-85) points out some short-term issues that urgently need to be solved, which are the sponsoring of employment and self-employment, the bolstering of

the internal management scheme, and the expansion of higher education in order to help expedite regional development.

Apart from these short-term issues, the Chinese government is confronted with some far-reaching long-term goals for its educational policies. In this respect it will be essential to tackle the problems of monetary inputs, lack of quality, and educational inequity, which were mentioned above in greater detail. (OECD, 2007: 85-86)

8. CHALLENGES FOR HIGHER EDUCATION IN 21ST-CENTURY-EUROPE

8.1. QUALITY

8.1.1. MEASURES OF QUALITY ASSURANCE

When determining how to measure a student's learning results, the matter of first and foremost importance is to evaluate what the academic content should involve. Looking back two or three decades, the standards of what a completed degree was supposed to involve was mainly determined by experience and prejudice. Expectations on the desirable academic content did not exist in written form per se. Even so, circumstances have long since changed; nations have started to issue "National Qualification Frameworks", allowing them to constitute values and skills students should have acquired in order to receive a degree. In 2002, the Dublin Descriptors, initiated by various European organizations for accreditation and quality assurance, was launched. It was brought into being in order to determine universal characteristics that would be necessary to obtain a degree at bachelor, masters, or doctoral level. (OECD, 2009b: 339)

In 2000 the "Tuning Educational Structures in Europe" program was introduced by a conglomeration of higher education institutions which was meant to focus on prerequisites for particular disciplines. In further course, they sought to collaborate with the European University Association so as to extend their body of participants, and applied to the European Commission for a stipend as a part of the Socrates program. As part of the project, competences are established by measuring studying results. That is to say that importance is laid on the knowledge students have acquired or can apply upon accomplishing their studies. One must not forget that this definition includes universal knowledge, as well as knowledge particular for the respective discipline. (OECD, 2009b: 339-340)

8.1.2. ENHANCING THE EFFICIENCY OF LEARNING

In theory it sounds perfectly acceptable to expect that students having completed a degree program should possess some core competences that they can apply. Still, the task of proving that the students indeed have acquired these competences is far more

complicated. A number of universities and as a matter of fact entire university systems are struggling to find a solution to this problem. What makes matters especially difficult is to measure universal skills like when it comes to team work and communication. So far it was common practice to teach and evaluate these competences parallel to those skills that are discipline-specific. It goes without saying that by applying this approach the universal set of skills can be overlooked easily if too much focus lies on the disciplinary skills. (OECD, 2009b: 341)

Undoubtedly, evaluating a student's performance by merely using a simple rule like a grade point average is highly controversial. Still, a not negligible number of nations chose to rate their students this way. However, slowly but surely this is starting to take on different forms. For instance, in Europe the "Diploma Supplement" is a step towards that change. Every student receives the Diploma Supplement with the grade for their respective coursework. The supplement is supposed to contain more information; in any case, the downside is that it only offers this information of the students' universal abilities, if their respective classes are explicitly linked to a particular area of universal skills. (OECD, 2009b: 341)

Rising weight is given to universal skills as part of qualification programs and the aspiration to offer more information of students' skills and knowledge is ever growing. Hence, this development is bound to have an essential effect on the foundations of higher education. Long-established academic practices will have to consider the consolidation with approaches stressing universal skills alongside traditional discipline-specific studying. While an entire shift towards the US model is not necessary, some serious transformations in the assessment of studying are necessary. (OECD, 2009b: 341)

8.1.3. QUALITY ASSURANCE ACROSS BOARDERS

The trend towards internationalization can be witnessed in matters of quality assurance. In Europe, but also in other parts of the world like South America, "Higher Education Spaces" are in the making. Within these, regulations are introduced so as to cut back discrepancies across nations. Without a doubt, these collaborations highly influence quality assurance within the respective nations. Europe's "Bologna Declaration", with its goal of establishing a "European Higher Education Area" (EHEA) by the year 2010, is a

commendable example for the on-going internationalization of higher education. Collaboration in matters of quality assurance is fostered by the Bologna Declaration. In particular, it aspires to introduce common benchmarks and practices of quality assurance. (OECD, 2009b: 342)

The OECD (2009b: 342-343) states that "In 2001, the Ministers of Education invited the European Association for Quality Assurance in Higher Education (ENQA) to help establish a common European quality assurance framework by 2010. Considerable progress has been made, and in 2007 the Ministers agreed to set up a European Register for Quality Assurance Agencies."

The European Association for Quality Assurance in Higher Education is an important factor for the evolution of quality assurance. Members of ENQA do not necessarily have to be EU member states. Regardless, the association was initially established with help of the EU and has been heavily fostered by it since then. The particularity of the association is that it played a key role in building European standards for internal as well as external quality assurance. Moreover, it carries responsibility for external agencies of quality assurance. (OECD, 2009b: 336)

8.2. EQUALITY

8.2.1. EQUITY IN HIGHER EDUCATION

The OECD (2008c: 2) gives following thoughts on the definition of equity in education:

> Equity in education has two dimensions. The first is fairness, which basically means making sure that personal and social circumstances – for example gender, socio-economic status or ethnic origin – should not be an obstacle to achieving educational potential.
>
> The second is inclusion, in other words ensuring a basic minimum standard of education for all – for example that everyone should be able to read, write and do simple arithmetic. The two dimensions are closely intertwined: tackling school failure helps to overcome the effects of social deprivation which often causes school failure.

Obviously, inequalities at lower levels of education have an impact on the degree of equality in higher education. As a consequence, students might be subject to certain disadvantages in higher education if their earlier education did not equip them with

sufficient premises so as to enable them to be accepted at universities. In some cases students are even misinformed, that is to say that they might not even be aware that entering higher education would be a possibility for them. Among the likely explanations for this, one can find the socio-economic background, problems with health, dropout of secondary school, as well as insufficient quality of primary and secondary education, to only name a few. (OECD, 2008b: 13-14)

Based on the definition of the OECD (2008b: 14) consider equity in higher education, keeping in mind that

> Equitable tertiary systems are those that ensure that access to, participation in and outcomes of tertiary education are based only on individuals' innate ability and study effort. They ensure that the achievement of educational potential at tertiary level is not the result of personal and social circumstances, including of factors such as socio-economic status, gender, ethnic origin, immigrant status, place of residence, age, or disability.

Ideally, apart from equality of higher education within the university system, policies concerning higher education should also be part of the equality debate. It is necessary to make amends for past policy mistakes involving inequality of education and its impacts on the labor market and beyond. A desirable goal for higher education would be a student body whose structure is representative of the entire society. (OECD, 2008b: 14)

One must not forget that one distinguishes between equity of access and equity of outcomes. While the former solely represents the possibility of students to enter higher education and various programs, the latter describes the possibilities a student has to move up in and complete higher education, as well as their return to higher education. (OECD, 2008b: 14)

The OECD further differentiates between equity and the equality of opportunities. On the one hand, quality of opportunities generally applies to the possibility one has to enter higher education and to how students are respected and tended to once they are part of the university system. On the other hand, according to the OECD "equity focuses on the conditions for acquiring operational skills that ensure the individual's employability and the success or failure of tertiary education to provide them." (2008b: 14)

One might wonder who the victims of inequality in higher education are. Factors contributing to students' vulnerability to inequality are their gender, cultural or ethnical background, age, disability, parental education and income, migration status, and place of residence, e.g. if they come from a remote area. (OECD, 2008b: 14)

8.2.2. HIGHER EDUCATION ACCOMPLISHING EQUITY

According to some researchers, differences in income of various groups across different ethnical backgrounds, and also of different gender, diminish as the subjects obtain higher education. Considering the gender gap, these findings could partly be due to better educated women's higher commitment to the labor market. (OECD, 2008b: 17)

The effect of the expansion of higher education on the equity of higher education should not be neglected. Because of this expansion, the supply of vacant university spots increased and, likewise, these spots should – in theory – be made available for students at a disadvantage. In any case, the issue of whether the expansion of education really helped reduce inequality of university access is not quite that easy to answer. (OECD, 2008b: 18)

With the on-going expansion of higher education one could observe the by-effect of increasing diversification. This diversification brought with it some new forms of inequity. According to the OECD in the majority of places, "the expansion of tertiary education has been accomplished mostly by expanding places in new, lower-status TEIs (leading to a stratification of the higher system by quality tiers); the creation of new subsystems, often more vocationally-oriented; the expansion of the private sector; and, sometimes, discriminatory fee policies whereby some students are fully publicly subsidised while others pay the full cost of tuition for the same education programmes." (2008b: 19)

Judging from this statement the conclusion seems to be that after the expansion of higher education, students at a disadvantage might, for the most part, be able to enroll only at those institutes of higher education that are considered to be of lower status. However, if they are accepted at other universities, they are very much more likely to be facing tuition fees. For this reason, examining inequities in higher education is becoming a task of ever growing complexity. (OECD, 2008b: 19)

8.2.3. WOMEN IN HIGHER EDUCATION

In the last decades, one can witness a substantial rise of female presence in higher education. A survey on higher attainment data of 2005 conducted by the OECD (2008a: 35-36) shows a tendency in favor of female students between the ages of 25 and 34. This development is illustrated in Figure 3.

Figure 3: Differences between the Percentage of Women and Men, Who Have Taken Part in Tertiary Education, Divided by Age (2005)
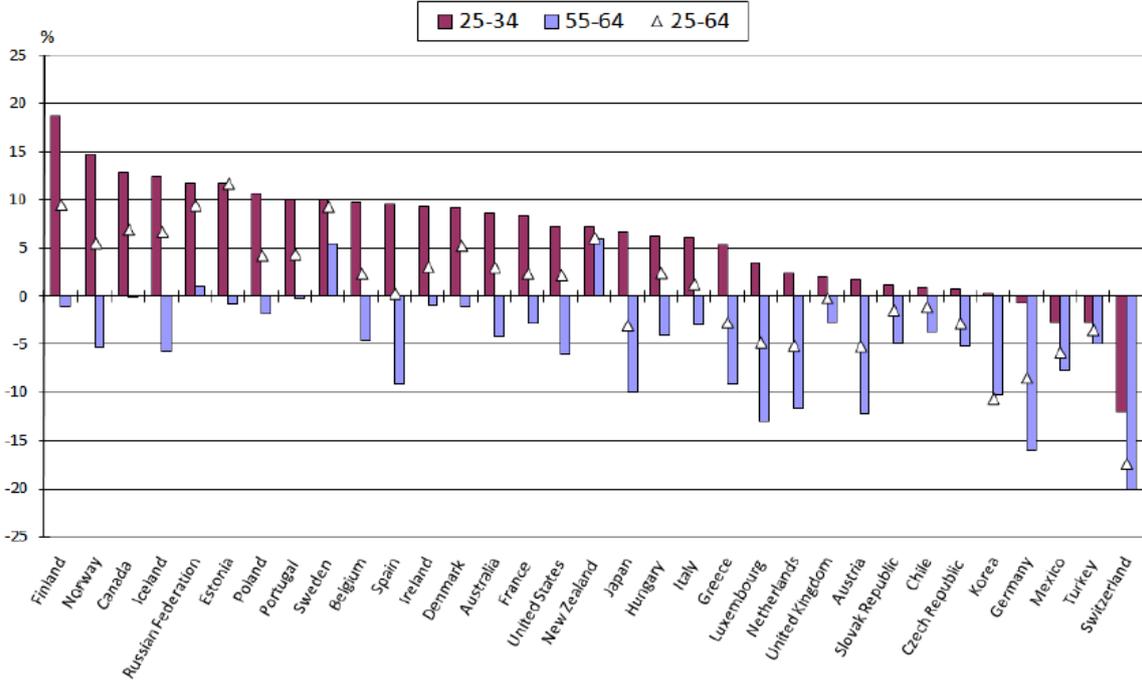
Source: OECD (2008a, Figure 2.6: 36).

In further research the OECD observes admission rates by gender of the same year. They divide their findings into three subgroups, which are higher-type A, higher-type B, and advanced research. In programs of type A, the higher net rates of women enrolling everywhere in Europe except for Germany, and Turkey is noticeable. There are indeed some nations like Estonia, Iceland, Norway, and Sweden were 25% more women than men are taking part in higher education. (2008b: 27-29)

Compared to the positive outlook for women in higher education presented above, in post-graduate programs the picture looks different. In advanced research net rates of admission are still in favor for men in the majority of nations with feasible information. Of course, there are some exceptions, like Estonia, Iceland, Italy, Spain, and Sweden.

Nevertheless, in most nations there has been a notable rise of women pursuing doctoral degrees. Consider, for example, the case of the Netherlands, where the ratio of women enrolled at doctoral studies has risen from 18% in 1990 to a respectable 41% in 2005. What with the positive prospect for women in under-graduate higher education programs, an amelioration of the portrayal of women in post-graduate programs as well as in leadership roles in their later lives seems to be a likely future development. (2008b: 27-29)

The trend in the European Union showed in 2009 that on average for every hundred men, 124 women participated in higher education. In addition, a persistent rise of 10% per annum of women taking part in higher education was noted. (Eurydice, 2012: 84)

On the one hand, in some nations like Germany, Greece (note that here data from 2008 was used), the Netherlands, and Switzerland, a fairly tallied participation of genders in higher education could be witnessed. On the other hand, particularly northern European countries like Estonia, Latvia, Sweden, Iceland, Norway, but also Slovakia showed very high enrollment rates of women; for one hundred men, at least as many as 150 women took part in higher education. Statistics showed that in the remainder of nations for 100 men 115 women or more were participating in higher education. (Eurydice, 2012: 85)

Furthermore, small nations like Cyprus and Liechtenstein had comparably few women enrolled at institutes of higher education. Note though, that this stems from the circumstance that the majority of students from these countries pursue their higher education abroad, because of the insufficient supply of (good) universities in their home countries. The country with the lowest rate of female participation of all the countries in question was Turkey, where only 77 women took part in higher education compared to a sample of one hundred men. That said, a sharp increase of female involvement in higher education could be witnessed in Turkey. In the time between 2000 and 2009 this rise of participation amounted to a total of 17%. (Eurydice, 2012: 85)

Most countries show a trend of increased female participation in higher education since the beginning of the millennium. Particularly high rises can be observed in the Czech Republic, Romania and Slovakia. In these cases, the participation rates rose from 99 to 130, from 107 to 128, and from 101 to 153, respectively. On top of that, an increase of 13% to 15% of women taking part in higher education was noted in Estonia, Germany,

Hungary, Malta, and the United Kingdom. In contrast, Bulgaria and Portugal are the only two countries, except for Cyprus, where female participation is lower now than in 2000, with a loss of 7% and 12%, respectively. On top of all these developments, the higher enrollment rate of women in higher education obviously affects the number of female graduates considerably. (Eurydice, 2012: 85)

8.3. RESOURCES

8.3.1. FACULTY

Universities often possess high degrees of autonomy, considering their position as employers, and they have much freedom in negotiating contracts with their staff. However, official guidelines on recruitment and teaching staff exist and build a general framework. (Eurydice, 2012: 117)

Most European countries apply systems in which teaching staff at public universities is contracted according to the common labor legislation. Generally speaking, the prominence of employing staff as civil servants is on the retreat, while hiring on a contractual basis is gaining popularity. Nevertheless, in fourteen countries and local municipalities, including Germany, Iceland, Spain, and Turkey, teaching staff is, to this date, employed under civil servants' contracts. Belgium and Austria make use of a combination of contracting staff under the contractual framework, but also as civil servants. To name an example, in Austria all teaching staff at universities of applied sciences are subject to the contract framework. (Eurydice, 2012: 117)

By comparison, some academic staff, like assistants, are employed under the contractual framework in most European nations. Hungary, Norway, and Slovenia form the exception to the rule; in these nations assistants enjoy civil servant status. In France and Turkey, it is possible for assistants to be career civil servants. (Eurydice, 2012: 117)

In the meantime, women account for an important part of university students. Yet, female teaching staff is still highly underrepresented at this stage. Women make up less than half of all teachers of higher education in all analyzed countries. The only exceptions here are Latvia, Lithuania, and Finland. The ratio of women teaching higher education in Finland rose from 47.7% in 2006 to 50.5% in 2009. Several countries,

nonetheless, have very low rates of women in teaching; often even under 40%. In Hungary, Malta, and Slovenia the rate of female teachers is particularly low. (Eurydice, 2012: 122)

8.3.2. FINANCES

As was already stated at an earlier point, the EU-27 spent on average, around 1.2% of their GDP on higher education, with high discrepancies between the various member states reaching from as low as 0.8% to as high as 2.2%. (Eurydice, 2012: 87)

In all European countries, primary and secondary education is provided for free, but students oftentimes are expected to pay for higher education. According to Eurydice (2012: 100), "[t]his partly explains why, on average, countries of the European Union spend 16.7 % of their total public expenditure on tertiary education in direct public support to tertiary students whereas the direct support allocated to those in primary, secondary and post-secondary non-tertiary levels (ISCED 1-4) amounts to only 3.7 % of total public expenditure on education." Only in Bulgaria students at primary and secondary schools are given more financial support than those of higher education. Moreover, in the Czech Republic and in Poland the discrepancy between the amount of direct support for students of primary and secondary as opposed to those of higher education is comparably low.

Registration fees are charged to students or parents in multiple nations. In the same way, the move from home to their place of study often causes additional costs for students of higher education. Therefore, it has become a popular custom for governments to simplify the access to higher education for a more diverse student body by offering direct public support. Direct public support makes up more than 12% of total public expenditure in over half of the European nations in question. Once again, high discrepancies can be observed for the different nations. While Croatia (3.1%), Poland (1.5%), and Switzerland (2.1%) supply their students of higher education with the least public support, countries like Cyprus, Denmark, the Netherlands, Norway, Sweden, and the United Kingdom offer as much as 25% and more of their public expenditure to students of higher education in the form of direct support. The exceptionally high amount of 50.9% of direct public support for university students in Cyprus can be traced

back to the fact that the multitude of Cypriot students studying abroad receives a vast amount of financial support. (Eurydice, 2012: 100)

Governments of all member states of the European Union subsidize spending on higher education. Still, the money allotted to the universities barely suffices to compensate more than the expenditures for tuition. If only in part, universities in the majority of nations rely on students and their parents to cover some of their expenses. Full-time students in these countries pursuing a Bachelor's degree have to add their own money in order to come up for their studies' expenditures. (Eurydice, 2012: 104)

In higher education the two most important kinds of fees are administrative and tuition fees. The former comprise one-time admission fees, annual registration fees, and graduation fees at the end of the studies. The latter are supposed to add to teaching expenses. Generally, tuition fees tend to be higher than administrative fees. Certain nations have particular regulations for students who have to repeat a year or need additional time for finishing their studies. Furthermore, Denmark, Greece, Malta, Sweden, and the United Kingdom (Scotland) are the lone five countries, where merely international students with origins other from the EU or the EEA, are obliged to come up with the fees for their bachelor degree programs themselves. In the case of the United Kingdom (Scotland) there is a public agency stepping in on the students' behalf and covering the tuition fee. They do this for all students regardless of their monetary circumstances, as long as an appeal is made and students do not have to re-take a year of their studies. (Eurydice, 2012: 104)

8.4. INTERNATIONALIZATION

8.4.1. THE INTERNATIONALIZATION OF UNIVERSITY SYSTEMS AND THE BOLOGNA DECLARATION

Starting in the late 1980s, apart from fast expansion of higher education, internationalization has become one of the major forms of change in higher education in the Western World. It goes without saying that there is adequate proof of communication and exchange between students and faculty across boarders in medieval Europe. Yet, in the last centuries, this exchange was mainly restricted to research. Therefore, studying and teaching were typically national affairs. This fact becomes

particularly obvious when considering the established practice in a plentitude of OECD countries of universities funded by the government. (OECD, 2008b: 235)

In an effort to promote internationalization, a number of countries have recently initiated changes of their public policies. These transformations were put into place in order to ensure transparency and cooperation between institutes of higher education. To achieve these goals, national degree frameworks and accreditation of skills and knowledge were aligned. In Europe this alignment of standards is taking place under the Bologna Declaration. As part of this declaration, in 1999 twenty-nine Ministers of Education of European nations agreed on making it their common goal for 2010 to set up a European Higher Education Area. According to the Bologna Declaration, special focus should lie on the amelioration of "comparability and compatibility of higher education structures and degrees in Europe in order to increase [...] the competitiveness and attractiveness of European tertiary education". (OECD, 2008b: 238)

With this statement in mind, the Bologna Declaration sought to inaugurate a system, which would simplify the identification of degrees across nations through the application of a "two-cycle degree structure". In 2003, this structure was expanded, belatedly, by incorporating a third degree, the doctoral degree, resulting in the Bachelor-Master-Doctorate structure. (OECD, 2008b: 238)

In the meantime, the Bologna Process has spread far beyond the borders of the European Union. At the time of the OECD's (2008b: 239) research, as many as 46 nations outside the European Union had started to implement the Bologna Declaration in their higher education systems. The countries engaging in the Bologna Process include - amongst others - Iceland, Turkey, and the Russian Federation. This increased engagement in the Bologna Process suggests a global trend towards an alignment of higher education structures. Besides, it has been widely acknowledged that the structure implemented as part of the Bologna Declaration bears similarities with the American framework of higher education degrees. The repercussions of the Bologna Process can also be witnessed in Africa, Australia, and Latin America.

The OECD (2008b: 239) further stresses the immense importance of the European Credit Transfer and Accumulation System (ECTS), which encouraged nations to adopt systems that would assist in the progress of comparing credits, in order to facilitate

student mobility. It is stated that such a system "constitutes a systematic way of describing educational programmes by attaching credits to their components, on the basis of different parameters such as student workload or learning outcomes." With the introduction of the ECTS system, the Bologna Process wanted to initiate an instrument to promote transparency. The core of the ECTS system is the students' accomplishments in their individual fields. It measures the students' amount of work, which is necessary to successfully complete their program's requirements, as determined by studying results, as well as the skills and knowledge obtained through their studies.

Additionally, the Lisbon Recognition Convention introduced the Diploma Supplement. Whereby a document is created which is supposed to be issued with every diploma of higher education, explaining the "nature, level, context, content and status of the studies that were successfully completed by the graduate." The aim of such a document is to simplify the academic as well as professional identification of higher education degrees. As with the Bologna Process, the Diploma Supplement has spread across the borders of the European Union, and again similarities to American norms are obvious. (OECD, 2008b: 238)

8.4.2. INTERNATIONALIZING TEACHING AND SUBJECT MATTER

Apart from aligning standards of accreditation, the wave of internationalization encourages an integration of intercultural exchange into studies and research. This integration aims to allow students to profit from an international experience, even when they are studying exclusively at their home universities. (OECD, 2008b: 240)

Promoting internationalization with regard to substance matter and its distribution is frequently called "internationalization at home". This term was coined so as to refer to internationalization that is happening at universities in the students' home countries, as student and staff mobility is on the rise (Wächter, 2003). Such forms of internationalization are particularly important in the production of global thinkers, since most university students still do not take part in more direct forms of international exchange. One should consider that in 2003 barely 4% of university students of OECD origin obtained university education abroad. In other words, domestic international-exchange is inevitable. Furthermore, Wächter (2003) argues that apart from internationalizing curricula and encouraging international cooperation, it is essential for

internationalization at home to incorporate the study of foreign languages. The access to a foreign language provides students with an important instrument for international communication. (OECD, 2008b: 240-241)

8.4.3. STUDENT AND STAFF MOBILITY

Another – quite obvious – type of internationalization is student or more generally people mobility. Global mobility is considered an extremely valuable policy move in a multitude of countries. On the one hand, there are nations who are interested in sending their students abroad in order for them to acquire international experience. On the other hand, some nations seek to invite students and researchers from abroad, which might, in some cases, encourage highly skilled workers to immigrate. (OECD, 2008b: 241)

Global student mobility might depict a number of different scenarios. For students mobility can mean anything from taking language courses to mastering their complete studies in a different country than their home country. In Europe multinational programs like the Erasmus program or the Norplus program – which is a peculiarity in the Nordic and Baltic nations – are pioneers for student mobility. It can be witnessed that more and more contracts are signed between universities in order to guarantee the availability of short-term exchanges, but also the completion of whole studies. Students often benefit from such collaborations by earning joint degrees. While there is a plentitude of types of student mobility, statistics (e.g. by the OECD) dealing with student mobility often only capture those students who are full-time students at foreign universities. (OECD, 2008b: 241)

Eurydice (2012: 107) names a number of existing support systems that are meant to boost student mobility all over Europe. A popular approach is to supply students with financial aid in order to assure them of the possibility of receiving loans from the home country.

However, one must not forget that apart from students, mobility also takes place in the surroundings of researchers and faculty. In this case, mobility might take on the forms of brief academic stays, sabbatical leaves, or even long-term stays involving regular employment. Staff mobility is not to be neglected, since it is essential for the development of scientific networking and collaborations with staff from foreign

universities. Moreover, from time to time, it goes hand in hand with program mobility. That is to say that staff mobility might involve professors holding a course from their home university at a branch institute abroad, or as part of an exchange arrangement. (OECD, 2008b: 241)

To round off the topic of individual mobility the OECD (2008b: 241-242) argues that global people mobility allows for direct intercultural encounters as well as for profound international adventures. Therefore, many OECD nations, and particularly the European Union, have been implementing policies in order to encourage their students to be part of international exchange, and thus benefit from important global contacts for their future careers.

9. EUROPE AND CHINA: A POLICY COMPARISON

9.1. LOCAL GOVERNMENTS AS AN OBSTACLE

In today's world, knowledge aggregation and economic growth have a profound influence on one another. Therefore, one would suspect that global players such as Europe would be shifting their focus on international educational topics, instead of hovering over internal issues, as was the case at the Lisbon summit. Losing the grip on such an important matter allowed other nations, and in particular emerging economies, to catch up on education. This is threatening the position that Europe would have liked to secure for itself in the global market of the future. (Huang and Soete, 2007: 3)

Since the beginning of the 21st century, there has been a rethinking of global economic paradigms. It can be observed that lately global economic growth has been going hand in hand with a faster distribution of technological developments across nations, as well as the global availability of knowledge conveyance. The isolation of a single country in this context would only be counterproductive. (Huang and Soete, 2007: 3-4)

Research suggests that growth in the BRIC and EU member countries is triggered by international exchange of knowledge and its growth. To those who have a deeper insight into the Lisbon agenda it might seem odd that, despite all these current developments, it is solely concentrating on the growth of European knowledge. (Huang and Soete, 2007: 3)

The vision of Europe becoming "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth region with more and better jobs and greater social cohesion", as Huang and Soete (2007: 4) put it, is an ultimate step of the internally directed path of the EU. This is the culmination of an era of prioritizing domestic issues.

It might be news to European readers that the situation in China is somewhat akin to that of the EU. As an example Huang and Soete name the significance of Chinese local governments. The Chinese central and local governments can be compared to the EU and its member states. (2007: 5)

In China, the local governments possess a vast amount of autonomy in questions of fiscal, economic, and political interest. The gap between the development of various regions in a country as big as China is obviously enormous. In this respect, it is quite clear that problems in one region might not be as pressing in another region and a third region might not have these problems at all. Thus, if not managed under national law the local governments are free to make arrangements for their regions themselves. (Huang and Soete, 2007: 6)

While in the past there has been a great deal of inequality in Europe among its member states, for China the issue of inequality is expanding ever so much. Aforementioned inequality is the source of various problems in knowledge development and distribution and corresponding steps in policy. Hence, Europe and China can put their heads together and profit from their past and present actions, respectively. (Huang and Soete, 2007: 6)

9.2. JUXTAPOSING POLICIES OF HIGHER EDUCATION IN CHINA AND THE EU

As mentioned above, the economic and political systems of China and the EU bear noticeable similarities. Furthermore, the kind of challenges China is confronted with in policies can be compared to European issues. One would suspect that these two economic powers would cope analogously with their policy problems. Nevertheless, evidence shows that this is not the case. (Huang and Soete, 2007: 15)

China and the EU face similar problems caused by the growing importance of the knowledge economy and the different approaches of coping with these issues. This should give an incentive for both of them to learn from each other. In the course of this chapter the reader will be introduced to the main concerns of the emerging knowledge economy in China and related policy actions that have been implemented step by step in the past. (Huang and Soete, 2007: 15)

At this point this master thesis will not go into further detail about sustainable development. Its apparent importance cannot be denied, especially with respect to the consequent possibilities of collaboration in the fields of knowledge development and distribution between the EU and China. The urgency of sustainability is often highlighted by the rising number of natural disasters in all parts of the world. Yet, given China's developmental agenda, the Chinese government might have to put in a harder struggle

to achieve sustainable development compared to its European counterparts. (Huang and Soete, 2007: 15)

9.2.1. DEVELOPMENTAL INEQUALITIES

Chinese federal governments are in a comparable position to the member countries of the EU. In the first case, federal governments act parallel to the central government in issues of modernization. In the latter case the respective countries are devoted to encouraging general education while overall the EU focuses on R&D. (Huang and Soete, 2007: 15)

In China, taxes are a federal matter, i.e. a number of regional tax offices and federal authorities gather the taxes. So, they can decide themselves on how they want to back R&D causing tremendous inequalities in R&D investments across provinces. Provinces that are higher developed tend to have more resources to support R&D at their disposal than those areas that lag behind in development. In other words, the economic as well as political landscape in China is defined by highly independent federal authorities. If there is a lack of nationwide legislation in federal interests, federal governments are able to decide themselves on these matters in their respective provinces. (Huang and Soete, 2007: 15)

From what has been mentioned so far, removing regional inequalities calls for action in China, as well as in the EU. A particularity to EU policies is that they managed to compensate the gap in income and development through structural funds. These funds were deployed for the least developed parts of the EU in order to support infrastructure amongst other realms. The European Investment Bank is relied on for this kind of payments. Accessing and distributing funds in this context involves relocating resources from better-off regions towards those suffering from a lack of infrastructure. It was difficult to keep up this policy under the continuous expansion of the EU. In any case, until today, this is a one-of-a-kind model. Not just does it diminish the economic disadvantages for the economically weaker countries, but it also has positive effects on the social integration of these regions. Through this mechanism, emigration to economically more appealing regions can be reduced, consequently preserving regional cultures. (Huang and Soete, 2007: 17)

This is another idiosyncrasy of the EU. As opposed to the United States, one can only observe very little migration movements within the EU. Furthermore, the migration that does take place happens mostly among those parts of the population with higher education and skills. The diversity prevailing in the EU, in respect to language as well as cultural identity, appears to be an obstacle to mobility. In other words, funding economically weaker regions within the EU would encourage local cultures. (Huang and Soete, 2007: 17)

In modern-day China, the gap between regions of different degrees of economic development is nonetheless growing. While certain parts of the country have managed to keep up with Western standards others are lagging far behind. This gives rise to the assumption that China could benefit from the European experience of policy making. Be it as it may, it cannot be denied that there have been issues in Europe's policies. However, to emphasize what has been stated above: With these policies the EU has managed a one-of-a-kind system of economic integration. (Huang and Soete, 2007: 17)

9.2.2. SUPPORTING INNOVATIVE INTERACTION BETWEEN UNIVERSITIES AND BUSINESS

Beginning in the 1980s, Chinese policies were aiming at linking the ties between industry and academics. "Push-" and "Pull-Side" policies were introduced in order to strengthen this bond. (Huang and Soete, 2007: 19)

On the "Push-Side" the government's monetary allocation towards S&T was decreased. This approach was intended to give S&T institutes an incentive to collaborate with enterprises for gain. Gradually, S&T institutes realized that by providing their services to firms and collaborating on R&D projects, they could increase their profit. The government could in the meantime fund those institutes that were focusing on basic research activities. (Huang and Soete, 2007: 19)

The "Pull-Side" concentrated on organizations that were taking care of a steady transfer of technology between the industry and academia. The "Technology Contract Law" from 1987 encouraged such transferal activities. Nowadays, these intermediary organizations are a firm part of a national system at the regional as well as at the national level. Technology retailers and consulting firms for technology are just two examples of a long

list of pertinent organizations that make up the aforementioned system. (Huang and Soete, 2007: 19-20)

In matters of supporting joint technology centers, China acted similarly to the EU in order to boost innovation and the collaboration of industry and academia. In 2007, four R&D rings in the sectors agriculture, coal mining, energy, and steel were founded by central government agencies. These rings consisted of 26 large enterprises with a total revenue of more than 900 billion RMB, 18 elite universities, and 9 R&D institutes. The collaboration between industry and academia in these four sectors ranged from simple projects to strategic alliances. The rings should create joint R&D funds and influence those R&D centers that were working on technologies for the sectors in question. (Huang and Soete, 2007: 20)

These policies conducted by the Chinese government exhibit its will to expedite an efficient innovation policy for economic and social development. After having pointed out the situation in China, this seems to be a good point to juxtapose Chinese policies with those of the EU. In Europe there are a wide number of thorough summaries and benchmarks of innovation policies of the different nation states. (Huang and Soete, 2007: 20)

9.2.3. HUMAN RESOURCES IN CHINA AND THE EU

Since the 1980s, China has been working on reforming its education under the laws of economic rationalism. Nonetheless, this reform, with a focus on decentralizing the financial structure and on branching out financial resources, was not able to boost the "ratio of public education investment to total public expenses". (Huang and Soete, 2007: 25)

A major drawback of this decentralization and branching-out approach is the increasing gap in educational development between geographical regions. Especially striking differences can be observed between the East and the West, as well as between rural and urban areas. This regional gap in educational development opened even wider with diverging economic growth rates across regions after the 1980s. (Huang and Soete, 2007: 25)

The two points above illustrate how the development of human resources deteriorates across China and, consequently, innovation activities are being held at a low level in the long run. Interestingly enough, the local governments seem to have greater authority in investment educational matters. This becomes obvious when looking at the "gradually declining ratio of education appropriation of central governments to that of local government". (Huang and Soete, 2007: 25)

Local governments have a big influence on some important matters of investment in education. The decisions they face include whether an investment in education should be made at all, how much should be invested, and which area especially requires an investment - primary, secondary, or higher education. All of these questions depend on the budget plan of the local government, as well as on its political orientation. (Zhang, 2002; Wang, 2002 cited in Huang and Soete, 2007: 25)

Considering the resources allocated to the development of education and human resources it is easy enough to see that the EU nations are at an advantage compared to China. It should not go without emphasizing that the problems that the EU and China are facing are quite alike. Like in China, education in Europe is a local matter, that is to say, a concern of the member states. Inevitably, this boils down to the fact that there are significant differences in handling affairs of education and human resource development among the different nations. Just take wealthier countries, like Scandinavian nations, and compare them to countries that have only recently become a part of the EU, like Eastern European nations. Even without much background knowledge, it is quite obvious that the amount of resources allocated to education between these nations can hardly be juxtaposed. (Huang and Soete, 2007: 25)

In addition, as was discussed in greater detail in Chapters 7 and 8, women and minorities are still at a disadvantage considering access to higher education. The demographic issues in the EU cast doubt about the matter, whether long-term growth and sustainability can be achieved for human resources. (Huang and Soete, 2007: 25)

All in all, the EU and China are both at a point where they need one another to improve their respective situation. While Europe is dependent on foreign talent, China still has to work on developing education, especially in the rural and economically less developed regions. (Huang and Soete, 2007: 26)

9.3. RECAPITULATION

Europe, as well as the rest of the world, is facing a growing number of severe demographic, economic, environmental, and social issues. In the light of these developments, it appears somewhat archaic to be supporting matters of education and innovation with the sole purpose of pushing European contestability. The positive effects of an easier accessibility of knowledge in Europe will not just be felt in society there, but all over the globe. (Huang and Soete, 2007: 28)

Simultaneously, future European progress will not just be dependent on the expansion of knowledge within the Union any more. In order to make profit off intellectual property Europe will have to make room for global knowledge exchange in various research areas. Establishing common uniform standards and spreading technologies across the globe may potentially prove to be essential. (Huang and Soete, 2007: 28-29)

Obviously, in an age of globalization Europe faces an increasing degree of international relations; by way of example, one could consider financial and investment flows, or relationships in fields like trade and knowledge. This could already be reason enough for Europe to overthrow its Eurocentric vision. On top of that lie opportunities only global collaboration can bring. Therefore, it will be unavoidable for Europe to go beyond the Lisbon strategy and act on a global level. (Huang and Soete, 2007: 28-29)

China and Europe will only be able to compete in the global market if they work together on the common issues they face. These include cooperating in topics like developing knowledge and distributing the current one. This will have to happen especially in those fields that are the most pressing issues worldwide. According to Huang and Soete this encompasses, among others "climate change and sustainable development; infant mortality, infectious diseases, HIV and more broadly health; water access and desertification; poverty and malnutrition, urbanization and rural development." (2007: 29)

Summed up, this means Europe needs to move away from the inter-European focus and think wider. The prevailing research from "North to North" has to transition into a "North to South" approach in order to distribute knowledge evenly. (Huang and Soete, 2007: 29)

10. FUTURE GOALS FOR HIGHER EDUCATION POLICIES

10.1. DEVELOPING SUCCESSFUL POLICY PROPOSALS

Obviously, policy reforms are the source of various difficulties; one of them being the sheer complexity of the policy decision making process. Since a plentitude of parties with different opinions and objectives are involved in higher education, the subsequent policy goals and ways to get to these goals go in different directions. As a result, it is a complex but yet essential duty of policy makers to create an equilibrium between the parties' different opinions in order to successfully promote higher education. The difficulty in this charge is to make sure that all parties approve of the decisions and do not threaten their operation. (OECD, 2008b: 311-312)

The creation of successful policies can be a delicate subject. In order to find out which processes of policy development render effective reforms, one has to consider empirical proof. The significance of agreement for fruitful policy decisions has already been discussed above. As a consequence, successful policy making will want to incorporate the effectiveness of the final policy on accomplishing the general agreement. Additional major players in the creation of policies are the scale of higher education reforms and the part played by policy executives. (OECD, 2008b: 318)

Just as empirical data can point out methods of creating prosperous policies, it can also be used to learn from past mistakes so as to overcome future complications. That is to say, the threat of possible defeats is lessened and fruitful results are more likely. (OECD, 2008b: 323)

Difficulties that occur most frequently are generally because of the opposition to restructuring by the various parties involved and can be traced back to three major sources. Firstly, parties involved in new higher education policies might obstruct these policies, for they might mean higher expenses than profits for them, either individually or as a group. The second source of resistance has to do with imperfect information of the parties involved. That can be imperfect information "either on the nature of the proposed policy changes, their impact, and most importantly, information on whether or not they will be better or worse off at the individual or group level." The third set of obstacles is due to psychological factors. That is to say, reforms of higher education

might be facing resistance because the public is not ready and as such the social reception of the reforms is deficient. (OECD, 2008b: 323-329)

The country-specific knowledge of higher education reforms and further awareness from past policy exertion suggest various attributes of policy creation which will be helpful for governments to master certain difficulties and accomplish general agreement. Therefore, such experiences will lead the way to successful higher education reforms, ultimately achieving the higher education aims of each nation. The inferences these past experiences have on the act of policy creation can be divided into three main categories. (OECD, 2008b: 333)

According to the OECD (2008b: 333-334) the first category deals with the creation of higher education reforms and policies. In this context, independent working groups should be founded in order to launch reforms of higher education and to engage the parties that are involved in higher education. The independent working groups should expand small scale initiatives into solid policy suggestions. Moreover, it is essential that the various opinions of all parties involved should thoroughly be considered.

The OECD states (2008b: 334-336) that the second category involves the "search for consensus or compromise". In this matter, pilots and policy attempts can and should be applied whenever necessary. Step by step policy reforms are to be given priority over approaches of complete policy reconditioning; the only exception holds true for the case if the broad public calls for reforms. Reforms with unclear benefits and accumulated expenses should be circumvented. Further, those parties who might be worse off after policy reforms need to be recognized and rectifications should be considered. Another aspect in this category is the introduction of surroundings allowing for the effective employment of reforms. A final point one must not forget is to enhance correspondence, especially concerning the communicating of the advantages of reforms and the disadvantages that failures to act have in store.

The last category of reform deals with the lucrative execution of higher education reforms and policies. It includes employment of complete sets of policy suggestions and the aid of efficient policy enactment. (2008b: 336-337)

10.2. CHINA

10.2.1. POLICIES FOR THE IMPROVEMENT OF QUALITY OF HIGHER EDUCATION

On the one hand, it is especially private institutes of higher education that are facing major issues considering quality of education. These problems stem from the fact that private institutes are fairly restricted in respect to monetary and human resources, as well as facilities and administration. The university system in China is nonetheless heavily dependent on private institutes of higher education. Private institutes of higher education are of great significance in covering demands of the labor market and in offering those students a chance for higher education, who otherwise would not be able to attend (public) higher education. In this case, it is essential for private institutes of higher education to live up to the responsibilities that their status in the Chinese university system calls for. Putting in place frequent evaluations of quality in order to guarantee the fulfillment of accreditation requirements would be a possible step in the right direction. Furthermore, some private institutes of higher education might profit from government support in matters of quality enhancement. (OECD, 2009a: 70)

On the other hand, the reaction of public institutes of higher education to developments of the Chinese economy is not happening in a timely manner. Generally speaking, a shift of attention away from concentrating on "quality assurance processes on the basic requirements for offering degree programmes" towards a heavier weight on learning outcome would be favorable. In order for such a shift of attention to happen, three major steps should be taken. (OECD, 2009a: 70)

The OECD (2009a: 70-71) claims that, firstly, persons responsible in Chinese education should widen their range of influence considering both the skills they are anticipating in their graduates, as well as the assessment of the educational programs' realization of these presumptions.

Secondly, in order to stay on top of the demands of the ever developing Chinese economy and society, a new draft of the educational goals is necessary. A National Qualifications Framework is a first step in the creation of such a document. The demand for higher education to supply students with "skills of critical inquiry, problem solving, communication and team work" beyond the traditional knowledge conveyed through

the current curriculum is rising. Therefore, many teachers are in favor of an active skills based way of learning, as opposed to the passive knowledge based method. To achieve a sustainable change away from the traditional methods calls for major transformations of customs and culture. According to the OECD, such changes are still at their very beginnings, with merely a small number of places moving away from the traditional methods towards an approach that encourages students to obtain a wider range of capabilities. (2009a: 71)

The OECD (2009a: 71) further claims that "there is need for a more systematic approach to reform of curricula, pedagogy and educational evaluation." Once again, a National Qualifications Framework would be a useful tool to bring these issues to the center of attention. Above all, it would be helpful in the identification of the anticipated skills of graduates at the various degrees of qualification. Ultimately, a framework of this kind would offer a structure of course design and evaluation for institutes of higher education. Additionally, it would give a whole picture of the possibilities and coherence that the various skills have in store. Therefore, such a qualifications framework would have to include both school as well as post-school training.

The third and final step would be one concerning the institutes of higher education themselves. At that stage, the OECD sees a high potential "for institutional leaders to engage more actively with employers of their graduates in the design of educational programmes and evaluation of their effectiveness." That is to say, it is a necessity for people in charge to look for increased interaction with their graduates' employers, in order to find out which skills they seek in their employees, and to remain well informed about the developments of their students in the job market. (2009a: 71)

10.2.2. POLICIES FOR THE IMPROVEMENT OF EQUALITY IN HIGHER EDUCATION

A desirable goal for policies should be to equivalently enable students with the same skills to apply to and be accepted at educational programs with the same requirements. One must not forget that in order to achieve equal possibilities in higher education, a strong base of monetary stabilization is needed in order to allow for similar opportunities across regions in China. The achievement of equal access to higher education requires admission policies that rest on intellectual skills and innate abilities, and not on a student's financial status. The application of such systems calls for

scholarships and loans that are distributed among those students who "demonstrate need so that they are not deterred from participating by up-front costs." (OECD, 2009a: 80)

10.2.3. POLICIES FOR THE IMPROVEMENT OF FINANCING OF HIGHER EDUCATION

China has entered a stage at which reconsidering its methods of financing students and institutions can no longer be postponed. On the one hand, that generally includes the funding of the improvement of higher education. On the other hand, it also includes the distribution of public appropriations among a wide array of undergraduate students, in the form of loans and grants. (OECD, 2009a: 88)

According to the OECD (2009a: 88), a possible plan of action for China would be the gradual introduction of normative funding rates; thus, enabling a greater degree of transparency and predictability to the distribution of resources. This approach would further bolster the range of tuition fees as a wide array of states of the labor market evolve. In order to achieve a favorable distribution of resources, a nationwide specification of costs for the respective fields of study could be conducted. The outcomes of such a study could be used to classify funding incongruities between estimated and realized distributions of resources, and as a result to evenly distribute resources across the various institutes of higher education, depending on their respective "profile of student enrolments across fields". In the course of time, through a series of regulations the distribution of resources between institutes of higher education would be harmonized.

However, a weakness of normative funding methods is that they tend to foster uniformity among institutes of higher education. A different approach, which could be used additionally to normative funding methods, would be to introduce a "deliberate mission-driven approach to the funding of TEIs [...] but also clarifying the roles of the other TEIs whose mission is not primarily oriented to basic research." (OECD, 2009a: 88)

It is essential that the governance of finance policies, what with the liability of employing resources efficiently, is done in proportion to possible hazards. That is to say, institutes of higher education that exhibit good governance and achievements will be rewarded

with greater degrees of autonomy in their usage of public resources. An additional possibility would be the introduction of "an income-contingent loan scheme" concerning all students of higher education. (OECD, 2009a: 88)

A vast number of different income-contingent loan programs exist; in order to figure out which possibility to apply, cross-national seminars with professionals of the different operating approaches could be organized. (OECD, 2009a: 88)

10.2.4. POLICIES FOR THE IMPROVEMENT OF THE INTERNATIONALIZATION OF HIGHER EDUCATION

Many attempts have been made in order to internationalize higher education in China. Nevertheless, the number of Chinese students studying abroad and students from abroad studying in China still lies under the OECD average of 4%. Therefore, there are still a number of issues that need to be handled. (OECD, 2009a: 108)

In absolute numbers, though, China - with Hong Kong counted as part of China – is the major exporting country of students receiving an education abroad. In the time between 1998 and 2007, the share of Chinese students studying abroad in OECD nations increased more than five-fold. (OECD, 2009b: 69)

It is quite obvious that China has been facing a fast expansion of higher education internationalization in the past decades. It goes without saying that this development had some positive impacts on China's science and technology; it fostered university research, and also spurred the training of professionals. Moreover, since China joined the WTO the internationalization of its higher education broadened even wider. Be that as it may, one should not lose sight of the issues for the Chinese government that are arising as a byproduct of increased internationalization. These problems include brain drain, inequality, monetary struggles, and the augmented imposition of political, cultural, and social beliefs of foreign nations in China. (OECD, 2007: 81-82)

Even in the wake of these challenges, China actively seeks to expand its ties with the rest of the world. In the midst of internationalization of its higher education, China tries to seize advantageous circumstances and, hence, overcome problems in its system. Doing so, its aim is to advance the organization of its higher education system, and to enhance

the institutionalization of its universities. The diligent cooperation in international educational concerns called for some hard work. Attempts were gladly made with the prevision of flawless regulation in higher education, and embellished global collaboration in higher education. (OECD, 2007: 82)

10.3. EUROPE

The steps that should be taken next within the EU are quite obvious. There has to be an increase in the quality of academia and in the fulfillment of different educational degrees, as well as in the equality in admissions to higher education. Accordingly, the funds spent on academia should be enlarged. (Veugelers and van der Ploeg, 2008: 19)

The administration of universities is an important issue as the importance of funding education is increasing across the EU. In order to achieve good outcomes the effectiveness of monetary allocations of the universities needs to be improved. (Veugelers and van der Ploeg, 2008: 19)

10.3.1. POLICIES FOR THE IMPROVEMENT OF QUALITY OF HIGHER EDUCATION

As was mentioned earlier, a lack of adequate investments and autonomy from the government, as well as poor administration are serious issues for the European university system. Because of these shortcomings, Europe cannot compete with other higher education powers like the US, Australia, or quickly emerging economies like China. Due to the problems that higher education in Europe is facing, it cannot keep up with the international pool of excellent students and staff. Europe's universities lie far behind their international counterparts in matters of research and teaching. These two areas require additional creative and innovative ideas as they tend to be developing very quickly. (Veugelers and van der Ploeg, 2008: 2)

10.3.2. POLICIES FOR THE IMPROVEMENT OF EQUALITY IN HIGHER EDUCATION

First of all, it is important to note that policy suggestions may vary from one nation to the next. While some of the recommendations might already have been implemented in one country, in another they might not even be applicable because of social, economic or even educational frameworks. Another point that complicates the drafting of sustainable policy suggestions is the lack of a solid data base covering a large enough sample of

nations. Therefore, the following points should be considered as suitable possibilities. The know-how of countries which have already made some expedient steps towards accomplishing equity in higher education is an essential asset in the gathering of successful ideas. Despite the differences across nations, one can observe several similarities in reforms that are happening at the moment. These shared policies include the need for policy intervention to take place at the early levels of education, customized initiatives and funding, a higher variety of program supplies, and a wider range of standards for selection. (OECD, 2008b: 59)

The OECD (2008b: 60-66) suggests a long list of policy recommendations. The first point they stress is that the source and amount of equity concerns need to be evaluated. As was already stated above, a universal point for policies to guarantee higher degrees of equity in higher education is for them to already start getting involved at the earlier stages of education. This goes hand in hand with a desirable increase of career counselling at schools. Most importantly, students studying at secondary levels should have equal possibilities to attain higher education, regardless of their specialization at school. Altogether, a reinforcement of the collaboration of the education systems at secondary and higher levels has to take place. Additionally, it would be beneficial to enhance the overlap and mobility between different kinds of institutes of higher education.

With the growing numbers of students and the thusly growing pool of skills and preferences, an expansion of the programs offered to the students will be essential. Additionally, the range of cultural backgrounds needs to be considered in matters of program development. Generally, the selection criteria at institutes of higher education should become broader and the institutes themselves should have more power in the selection process. Further, unusual paths of attaining entitlement to enroll for higher education should be given consideration. (OECD, 2008b: 61-63)

In order to allow students even in the remotest areas to take part in higher education an extension of long-distance learning as well as having local institutions for learning is a necessity. On top of that, thought should be given to affirmative discrimination policies supporting students whose prior education might otherwise be considered insufficient. In fact, higher institutes of education should be encouraged to expand access and offer

additional help to underprivileged students. This especially includes adult learners, students with disabilities, and women. Considering gender inequalities, particular measures should be taken to close the gap, including the reducing of gender stereotyping in the selection of the respective field of study. In a nutshell, it is the outcomes that should matter most. (OECD, 2008b: 62-66)

The best possible number of admissions and fair conditions for access cannot be achieved solely through offering higher education without charge. Especially the matter of access to universities can be tackled more efficiently through various means. This sheds a different light on the arguments for tuition fees. In this context, student loans and scholarships for particularly well-performing students of any social backgrounds can lead to a higher degree of equality in access to universities according to Veugelers and van der Ploeg. With the exemplary students receiving these kinds of loans, other well-performing students from all kinds of social backgrounds are given an incentive to pursue academic careers themselves. Learning from these cases, a change away from scholarships for underprivileged students to well-performing students of any financial background would immensely contribute to Europe's university system. (2008: 20)

There is a net of monetary support put in place to help students of higher education and their parents cover their expenses. Usually, this net exists in order to secure "equality of educational opportunity for all and, more specifically, the widening of access to tertiary education." Some nations even try to encourage students to become financially independent from their parents. One can divide the support network into three main kinds. First, as a means of financial support, loans or grants are given in order for students to cover their living costs. A second form of financial support is loans, grants, exemptions or reductions in order to relieve the burden of administrative and tuition fees. The third group is financial assistance, which is given to the student's parents either through family allowances or as tax relief. (Eurydice, 2012: 106)

10.3.3. POLICIES FOR THE IMPROVEMENT OF FINANCING OF HIGHER EDUCATION

As previously stated, in order for higher education to be funded appropriately, in Europe and elsewhere, public investments are not enough. This is the point where private funding is inevitable. Adequate documentation shows that there are still numerous possibilities for improvement concerning private investments especially in areas with

significant private returns. A popular demand is the increase of students' tuition fees. The extent of returns for private as opposed to social benefits varies over the different levels of academic degrees, as well as across different fields. Indeed, the ratio of public to private investment varies. (Aghion et al., 2007; Veugelers and van der Ploeg, 2008: 20)

As with the policy suggestions for equality in higher education, again, it is important to note that also the policy suggestions for financing of higher education may vary from one nation to the next. The know-how of countries which have already made some expedient steps towards improving the funding of higher education is an essential asset in the gathering of successful ideas. Despite the differences across nations, one can observe several similarities in the reforms that are happening at the moment. These shared policies include "that systems will be best served by the principles of cost-sharing, public subsidies allocated in relation to the benefits brought to society, access facilitated to all individuals apt to benefit from and willing to enter tertiary education, and rewards to those institutions whose missions are successfully accomplished." (OECD, 2008a: 232)

Even so, one must not forget that reciprocities between certain policy suggestions compromise their operation. Take, for example the interrelatedness of transparent financing and the choice of financing sources that are needed to successfully guarantee the fulfillment of the government's strategies. As a higher number of financing sources is applied to fulfill the policy strategies, a greater degree of involuntary responses might emerge. (OECD, 2008a: 232)

The most important policy issues firstly include the introduction of a financing plan that promotes the involvement of higher education in the overall economy and society. Further, the OECD suggests that the distribution of expenses between the students and the respective government would be beneficial for creating a sustainable way of financing higher education. At the same time, higher education programs should be supported financially with public money in accordance to the welfare they guarantee for society. Institutional financing should be assessed by particular procedures that include input as well as output parameters, and strategically located elements. It goes without saying that policies enhancing cost-effectiveness should be put in place. As a final policy suggestion the OECD names the general support of financing including a complete

scheme for student aid. (OECD, 2008a: 233-241)

10.3.4. POLICIES FOR THE IMPROVEMENT OF THE INTERNATIONALIZATION OF HIGHER EDUCATION

A number of developments of internationalization are indicating the direction of possible future policies in order to assist nations in reaching their goals for internationalization and to maximize the outcomes of getting involved in international collaboration and networking. Once again it is important to note that the policy suggestions for internationalizing higher education may vary from one nation to the next. The know-how of countries which have already made some expedient steps towards encouraging internationalization of higher education is an essential asset in the gathering of successful ideas. (OECD, 2008b: 293)

The first major subgroup of policy implications implicated by the OECD (2008b: 293-296) is the need for a general scheme and navigation of the internationalization policies. Obviously, first of all an inclusive policy structure should be introduced, and sustainable ways of internationalization should be endorsed. Further, institutes of higher education should be encouraged to behave as active drivers of internationalization. Additionally, programs to aid universities with their internationalization approaches need to be developed.

The second classification of policy implications fosters the desirability and international contestability of the university systems. As a start, programs encouraging the national university systems should be put in place. Next, the commensurability of higher education on a global level needs to be improved. As a result, alternatives to the presently widely used international rankings need to be considered. As a matter of fact, keeping future international students well-informed is a necessity. Finally, while exceptional institutes for post-graduate degrees should definitely be supported, at the same time the quality of transnational education at the under-graduate level has to be guaranteed. (OECD, 2008b: 296-298)

The OECD (2008b: 298-299) describes the third category of policy suggestions for the internationalization of higher education as the "internal dimension" of internationalization. In consequence, it includes the introduction of internationalization

on-campus and the support of teacher and student mobility (for domestic students and teachers).

Ultimately, the programs for internationalization need to be ameliorated in the best possible way. In order to achieve such an optimization, policy makers need to be well-informed in matters of internationalization, they need to make the most of transnational similarities, and assess the migratory movements due to internationalization. (OECD, 2008b: 299-300)

10.4. CONCLUDING REMARKS

The thesis has offered insights into various aspects of higher education in China and Europe. The reader was informed about the role of knowledge in modern societies and the modern global economy. While the importance of knowledge is growing around the world, this development causes a number of problems. Nations of the world are putting higher value on a highly skilled population. This shift of preferences leads to a dispute that is referred to as the global skills race. By now, this development has long since left the boarders of the Western World and swept across developing nations.

For decades economists and mathematicians alike have been working on models so as to understand and demonstrate the influence of education on the economy. The basic growth accounting approach takes the basic ideas of returns to education and extends them by macroeconomic parameters. While growth accounting models are excellent sources for unfolding the influences of human capital on growth, they are facing a plentitude of limitations. In fact, Solow has been working on further developing this approach as early as in 1957. Until this day, his works are an essential part of the neo-classical growth literature. Nevertheless, even Solow's works were not flawless, and hence, there are many extensions and ameliorations of his model. Adding externalities to Solow's approach, as was introduced earlier, is only one of many possible improvements.

The development of new growth theories has become a necessity in overcoming the rigid restraints of the neo-classical model. Models of endogenous growth can be divided into two subgroups. The first type includes the accumulation and movements of human capital. The second one deliberately deals with the reserves of human capital. An

important class of models describing endogenous growth is the class of AK models, developed by Frankel and Romer, to only name two important contributors. In their models, they include technological change as an important factor in the growth of capital. One of the results of the Romer model is that technology is a necessity for positive effects of financial policies on the economy.

Apart from these rather traditional mathematical models, there is a multitude of yet newer and more experimental approaches. In order to illustrate some of these models, the reader was firstly presented with multi-sector growth models, which form an important extension of the models from above. It is essential to consider multi-sector models of this kind, since they offer further understanding of economic interdependencies. Another quite unorthodox approach, that includes additional critical factors of today's world, such as pollution, is the chaos theoretical model as developed by Day.

Obviously, apart from the mathematic models there is also a broad spectrum of empirical research on the matter. With their empirical results, researchers like Barro provided some essential insights into the impact of higher education on the economy.

When estimating the impact of higher education on the over-all economy, one is quickly confronted with the problem of lacking comparability of knowledge and knowledge creation. While it has been a long standing practice to measure knowledge by years of schooling, this approach has been scrutinized lately, as it does not contemplate the quality of education. Quality of education is important, as high quality knowledge and a highly skilled workforce obviously has different effects on the economy as compared to a lower skilled workforce. Merely the years of schooling do not accurately reflect the skills-level of a population, for education structures vary greatly over different nations.

A high-quality university system will equip its students with sufficient knowledge, so they will meet the demands of the quickly changing economy of the 21st century. Some of the skills that are desirable in today's job market are the discovery and solving of quickly emerging problems, inter-cultural communication skills, the ability to work in teams, and the critical reflection of learning contents.

Some major factors in determining a universities quality can be defined as richness in

resources, selectivity in the admissions process, and quality of the communication of learning contents. In simpler words, the last point includes the students' ability to take in knowledge and apply methods of critical thinking.

To ensure that an education system can live up to these high quality standards, it needs to perform a number of restructurings. First of all, students should increasingly be actively involved in the educational process. This calls, secondly, for good relationships between teachers and students; this falls under the overall task of improving teaching. A last and extremely important point in securing quality of higher education is to provide equal opportunities for admission to higher education.

With high quality knowledge being increasingly important and the resulting fast expansion of institutes of knowledge creation, i.e. universities, came the need to compare the achievements of these institutions. Thus, on a global scale rankings were introduced in order to deliver satisfying results to questions of comparability. While these rankings are a useful tool in providing a common structure in international university systems, their disadvantages are numerous. For one, they are creating competition among universities, eventually being of a benefit only for elite students and universities, while the rest are drowning in mediocrity.

The example of China illustrates the global expansion of higher education. The higher status of knowledge has played an important role in driving China's economic development. In any case, with the many positive aspects of higher education in China, there are also some serious flaws in the system, and the question remains if the university system in China can sufficiently cover the large demand for university education. Undoubtedly, China is aware of the challenges of its higher education system and started to implement some reforms in the late 1990s. These reforms aim to tackle issues like the disadvantages of students from rural areas, as well as questions of the quality of higher education. It is important for China to work on its higher education system, since, as a major player in the global economy, its decisions in matters of higher education have repercussions all over the world. These repercussions are not just restricted to higher education itself, but also influence international trade and the production of knowledge intensive goods.

At the same time Europe needs to decide on where its place in the global economy of the

future should be. If Europe opts for becoming the global center of knowledge creation, it has to seriously re-think and support its university system. While Europe is facing challenges of staying competitive in the areas of research, teaching, and knowledge distribution, the common shortcomings of European education policies are that they are often too nation-centered and that most of their focus lies on primary and secondary education. From the search for possible reasons of what makes a university system successful, one can reason that the two most important factors for successful universities are an institution's accountability and autonomy. The three major areas that need to be covered in order to boost Europe's university system are its finances, administration, and also the competition among universities. Keeping these three points in mind, the quality of European universities can be enhanced sustainably, without running the risk of degradation of quality or monopolization.

Higher education in China is still facing a number of severe issues that need to be dealt with. The matter of offering high quality higher education is one of the pressing concerns. It goes hand in hand with questions of quality assurance and the assessment of quality of research and fields of study. In both cases there are several agencies put in place that try to find solutions to the ever evolving problems. First and foremost, as has been stressed at various points, higher education should be encouraging students to learn efficiently. However, teaching students of higher education to reflect critically about their studies has been neglected severely in Chinese higher education policy. Therefore, and for additional reasons, such as the lack of English language skills, many employers prefer to hire graduates from abroad as opposed to Chinese graduates. China has to acknowledge its policy shortcomings in these fields and start coming up with a plan to tackle these issues.

In matters of equality of higher education, first of all, China has to reduce discrimination in questions of admissions. People suffering most from inequality of admissions are people with disabilities and people with minority backgrounds. Furthermore, vast regional differences make it difficult for students from rural areas to attain higher education. A somewhat positive development is the role of women in higher education. By 2004, almost half of all students admitted to higher education were women. What is more, it can further be witnessed that more and more women pick up traditionally male-dominated fields like sciences and engineering. As for resources, it should be mentioned,

that with the vast expansion of the student body, Chinese universities significantly raised the number of teachers in the last decades. Despite this favorable development, Chinese universities should be careful not to compensate this quantitative expansion with a lack of quality.

A welcome trend is the increasing internationalization of the Chinese higher education landscape. Apparently the role of globalization of higher education has been acknowledged and the Chinese university system is opening up to international exchange. A number of policies are already in place to encourage Chinese students to study abroad and Chinese universities to accept foreign students. In a nutshell, for Chinese higher education, the aspects that require new policies most can be summed up as equality, quality, and monetary inputs.

Considering Europe, issues of quality assurance are of great importance as well. What with the many players in Europe, it is essential to set up a framework of quality assurance across national borders. Just like China, European policies should foster the efficiency of learning. That is to say, students should be supported in learning comprehensively. Consequently, traditional approaches of assessing students' knowledge should be reconsidered. Ultimately, the transnational comparability of students' capabilities should be guaranteed.

Students' abilities should be the reason for them to be accepted at university, regardless of their background, cultural heritage, gender, or disability. Therefore, it is essential to guarantee equal opportunities for university access. In this respect, there are certain policies which should already be applied to students of primary and secondary education, to ensure a reduction of discrimination at these early stages.

In view of gender differences of higher education in Europe, a rise of female participation over the last decades can be witnessed. Even so, across the different EU member states, the rates of female to male students vary drastically. For this reason, in some nations it will be a necessary goal to harmonize this ratio in the near future. The gender gap is still very visible in the participation of women as teachers of higher education. In this respect, almost all European nations have a lot of catching-up to do. Also, when it comes to funding, the share of GDP invested into higher education has to be drastically expanded still.

Since the 1980s internationalization has become an important part of higher education. In various countries public policies have been introduced in order to further boost international exchange in higher education. One of the best-known examples for such policies is the Bologna Declaration of the European Union, with its influence being long since felt across European borders in places like Africa, Australia, and Latin America.

While this approach heavily stresses the alignment of accreditation, it is very important to profoundly promote international collaboration and cultural exchange through teaching and research. A promising development of internationalization in Europe is that both internationalization at home, but also student and staff mobility are being increasingly supported. Not least, it is becoming easier for universities and academic programs to move across European borders.

Among the similarities of the university systems in China and Europe one can make out the significance of local governments. Nonetheless, the local governments' powerful position causes severe problems in both economies. Economic integration should be a goal in both China and Europe in order to compensate for the vast developmental discrepancies between regions. Another policy concern China and Europe share is the interaction between industries and academia that should be strengthened. Innovative interaction of universities and industry is essential for social and economic development. Both economies are aware that backing human resources is a necessity for being able to live up to the demands of the global knowledge economy. In order to guarantee a strong human capital base, the prevailing inequality of access to higher education needs to be reduced both in China and Europe. Ultimately, China and Europe are caught in a place where there is no way around collaborating in questions of higher education. Cooperation needs to take place in respect to knowledge creation and delivery.

All in all, at the moment we are witnessing a time of challenging but yet very critical decisions in Chinese and European higher education. It might be helpful to consider some of the policy proposals that have been stated at the beginning of this very chapter. In times like these, with knowledge being essential for the well-being of the world's economy, China and Europe must not miss their chances to implement some crucial changes in their higher education policies, especially concerning the issues of quality,

equality, and financing. While obviously there are numerous obstacles on the way to policy implementation, the biggest mistake would be not to act at all.

APPENDIX

Table 1: Barro's Results

Independent variable	Overall sample	OECD sample	Rich-country sample	Poor-country sample
Log GDP	0.107*	-0.034*	-0.0343*	-0.0190*
Log (GDP)squared	-0.0084*			
Years of upper school for males over 25	0.0044*	0.000	0.0023*	0.0084*
Govt consumption/GDP	-0.157*	0.015	-0.014	-0.167*
Rule of law index	0.0138*	0.0115	0.0116*	0.0196*
Exports + imports/GDP (Openness ratio)	0.0133*	0.0148*	0.0112*	0.0361*
(Openness ratio)* Log GDP	-0.0142*			
Inflation rate	-0.0137*	-0.0228	-0.0051	0.0033
Log fertility rate	-0.0275*	-0.0209*	-0.0174*	-0.0212*
Investment/GDP	0.033	0.045*	0.029	0.053
Growth rate terms of trade	0.110	-0.010	-0.008	0.0134*
Observations & R squared				
1965-75	81, 0.62	23, 0.85	32, 0.77	49, 0.48
1975-85	84, 0.50	23, 0.65	32, 0.62	52, 0.39
1985-95	81, 0.47	23, 0.50	31, 0.52	50, 0.44

NB: * indicates coefficient is statistically significant at 5 % level

Source: Wilson and Briscoe (2004, Table 9: 45).

Table 2: Admissions for Higher Education in China (1996 – 2005)

Unit: 10,000 persons

Year	Number of admissions year (urban)	Number of admissions (rural)	Number of registrants for entrance exam (urban)	Number of registrants for entrance exam (rural)	Admission rate (urban)	Admission rate (rural)
1996	52.03	50.75	111.75	152.48	46.56 %	33.28 %
1997	53.15	52.66	123.64	157.05	42.99 %	33.53 %
1998	59.82	55.77	142.22	173.79	42.06 %	32.09 %
1999	84.47	74.40	157.02	180.30	53.80 %	41.26 %
2000	116.00	106.00	193.00	196.00	60.10 %	54.08 %
2001	150.55	133.76	230.59	227.40	65.29 %	58.82 %
2002	181.90	168.14	263.41	267.35	69.06 %	62.89 %
2003	214.40	213.99	295.73	324.56	72.50 %	65.93 %
2004	246.64	273.04	334.60	396.87	73.71 %	68.80 %
2005	269.27	303.81	393.85	482.96	68.37 %	62.91 %

Source: Li et al. (2008, Table 2: 9).

Table 3: Admissions for Higher Education in China: Relative to Population (1996 – 2005)

Unit: 10,000 persons

Year	Admissions (urban)	Admissions (rural)	Population (urban)	Population (rural)	Admissions rate to population (urban)	Admissions rate to population (rural)
1996	52.03	50.75	37,304	85,085	0.14 %	0.06 %
1997	53.15	52.66	39,449	84,177	0.13 %	0.06 %
1998	59.82	55.77	41,608	83,153	0.14 %	0.07 %
1999	84.47	74.40	43,748	82,038	0.19 %	0.09 %
2000	116.00	106.00	45,906	80,837	0.25 %	0.13 %
2001	150.55	133.76	48,064	79,563	0.31 %	0.17 %
2002	181.90	168.14	50,212	78,241	0.36 %	0.21 %
2003	214.40	213.99	52,376	76,851	0.41 %	0.28 %
2004	246.64	273.04	54,283	75,705	0.45 %	0.36 %
2005	269.27	303.81	56,212	74,544	0.48 %	0.41 %

Source: Li et al. (2008, Table 3: 10).

Table 4: Administration of Higher Education in OECD Countries

	US	JAP	UK	SE	DK	FIN	GE	FR	GR	IT
Autonomy										
Selection of students	7.8	6.6	6.7	8.9	7.0	7.1	2.8	2.8	10	3.7
Budget flexibility	8.5	8.2	6.8	6.2	6.2	7.7	7.2	6.8	7.9	7.0
Staff Policy flexibility	10	10	10	10	10	7.5	7.5	1.8	4.9	7.9
Hiring/Firing	10	10	10	10	10	10	10	0.9	3.8	10*
Wage/ non-wage conditions	10	10	10	10	10	5	5	2.7	5.9	5.7
Course content	10	10	10	5.5	10	10	5.5	10	10	5.5
Accountability										
Evaluation Mechanisms	6.6	6.2	7.7	6.5	4.6	4.0	6.9	5.6	6.5	6.8
Funding Rules	3.6	3.9	5.5	4.6	5.3	6.2	5.2	6.6	4.8	5.9

Source: Veugelers and van der Ploeg (2008, Table 16: 16).

Table 5: Institutes of Higher Education, Staff and Faculty in China (2004)

Type of institution	Institutions	Staff	Faculty
1. Institutions offering Postgraduate programmes	769		
Regular TEIs	454		
Research institutes	315		
2. Regular TEIs	1,731	1,610,658	858,393
TEIs offering bachelor degree programmes	684	1,137,005	575,334
TEIs offering short-cycle programmes	1,047	403,616	237,654
of which higher vocational-technical colleges	872	327,536	193,432
Independent branches of universities and short-cycle courses	364	70,037	45,405
3. Adult TEIs	505	154,986	86,065
4. Privately-run TEIs	1,187	54,941	26,048

Source: OECD (2009a, Table 2.3: 34).

Table 6: Associations of Institutes of Higher Education in China with Governmental Bodies (1997 – 2004)

Year	Number of TEIs	TEIs affiliated with Ministry of Education	TEIs affiliated with other Ministries	Local TEIs	Privately-run TEIs
1997	1,020	35	310	655	20
1998	1,022	45	218	734	25
1999	1,071	46	202	786	37
2000	1,041	72	44	888	37
2001	1,225	72	39	1,025	89
2002	1,396	72	39	1,154	131
2003	1,552	73	38	1,268	173
2004	1,731	73	38	1,394	226

Source: OECD (2009a, Table 2.4: 34).

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