



The Immigration of Foreign Academics, Scientists and Engineers to Germany

What factors influence the immigration of academics, scientists and engineers from third countries to Germany?

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Abstract

In times of a growing need for highly qualified manpower, Germany is faced with the problem of attracting foreign academics and scientists. Especially the sub-group of engineers is essential for its export-led economy. Against this background, the question must be asked what kind of factors influence the immigration of academics, scientists and engineers from third countries to Germany. According to the theory of talent mobility by Solimano (2008), it is assumed that factors like international differences in earnings and development gaps, agglomeration and concentrations effects, linguistic compatibility, networks and socio-cultural affinity as well as policy regimes and immigration policies might be essential determinants that can either attract or push back foreign academics and scientists. First, this bachelor thesis tries to give an overview about the current situation in Germany, its necessity to attract more foreign academics, scientists and especially engineers and presents already existing reforms the German government has implemented in order to achieve this goal. Second, by using the theory of Solimano, hypotheses about the possible influence of the specific factors are formulated and tested by conducting expert interviews with governmental officials, lobby groups and research organizations and foundations. With regard to the factor of policy regimes and immigration policies, special emphasis was put on the German Immigration Act in 2005. Further, due to the special role of engineers in the German economy, this bachelor thesis tries to identify possible differences in the influence of the distinct factors for academics and scientists in general and the specific sub-group of engineers. According to the interviews, it can be concluded that international differences in earnings have a greater impact on the immigration of engineers than on academics and scientists in general. Regarding academics and scientists, the influence of networks and immigration policies are essential, whereas socio-cultural affinity plays only a minor role. Moreover, the experts refer to additional factors that are important for the immigration of academics derived from the interviews. Finally, possible solutions are presented to improve the conditions for the immigration of academics and researchers from third countries to Germany.

1. Introduction

Since the late 1980s the world economy has become more and more globalized. This development came along with a liberalized world economy, which is organized around supply and demand factors. Especially the flow of goods around the globe has caused a revolution for the manufacturing sector. Based on this, nearly all countries around the globe are competing with each other due to the global market. Some of these countries formed economic alliances, like the European Union or the NAFTA, to get a better position within the global market. Factors like production costs, wages, quality and infrastructure are essential elements to maintain or reach an advantage of location for countries, but also the recruitment and exchange of qualified labor force has gained more and more importance for the economic development of states. Hence, knowledge has become a major production factor and is one of the most important impetus for economic growth. This phenomenon is

accompanied by an increased demand for mobile and highly qualified labor force. Especially since 2000, when the Lisbon Strategy promoted that Europe should become "the most competitive and the most dynamic knowledge-based economy in the world" (European Union, 2000), the topic of highly skilled labor force gained more and more importance. This underlines the fact that Europe needs highly qualified manpower in times of a knowledge-based economy, especially people with a tertiary educational background.

Nevertheless, the phenomenon of mobility of professionals is not new in history. There are many examples where the emigration of religious or political groups had negative economic and social consequences for the host countries. For example, the expulsion of Spanish Jews and Moors at the end of the 15th century can be seen as an important reason why Spain lost its economic and scientific superpower because the Jews and Moors held major positions in science and economics. Many of the Jews and Moors had studied at famous universities of Christian Europe, like Salamanca (Heyd, 1963).

This short example makes clear how essential highly qualified academics are for national economies. However, the way of migration of professionals has changed since the end of the Second World War. Before the Second World War the migration of highly skilled personnel was mostly motivated politically and can be regarded as mass migration. Today, it can be regarded more as a choice made by the individuals themselves based on better working conditions or higher salaries in the target countries. There are "classical" immigration countries that are very attractive. These "classical immigration" countries, like the United States and Canada, already had for a long period experience with the recruitment of highly qualified professionals, especially in the case of academics and scientists. Most notably, in the United States highly skilled immigrants have contributed to economic success. However, within the most EU member countries this topic was neglected for a long time.

This is especially true for Germany where the need for foreign professionals was even reinforced by two factors. On the one hand, the expansion of the export-oriented economy demanded for very high numbers of qualified labor force, whereas demographic changes caused a decrease of domestic highly skilled employees. However, to maintain Germany's top position as an exporter of technology it needs to attract highly skilled professionals who are able to develop new technologies that are required on the global market and train students or do research at German universities. Therefore, within the group of academics and scientists, engineers play an important role for the German economy. To attract more highly skilled professionals, the German government decided in 2005 to reform its immigration law to lower obstacles for foreign academics and scientists from non-EU countries that would like to come to Germany.¹ Thus, it can be assumed that Germany has recognized the necessity of attracting more foreign highly skilled professionals in order to maintain and strengthen its economic position. To be able to achieve this goal, it is on the one hand important to identify what kind of factors might attract foreign academics, scientists and engineers. On the other hand, also possible hurdles should be determined.

¹ According to the Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market, every EU citizen has the freedom to provide its services in every EU member state. Therefore, the reform of the German immigration act does especially apply to third country nationals.

Therefore, I would like to ask the following general research question:

What factors influence the migration of academics and scientists from third countries to Germany?

Based on this general research question, I would like to ask the following sub-questions in order to get an adequate answer.

1. *To what extent has the reform of the German immigration Act in 2005 improved the conditions for foreign academics and scientists from third countries to Germany?*
2. *How is the migration of academics and scientists from third countries to Germany driven by the salary?*
3. *How important are networks and the reputation of a specific institution for the migration of academics and scientists from third countries to Germany?*
4. *To what extent do linguistic compatibility and socio-cultural affinity influence the migration of academics and scientists from third countries to Germany?*
5. *How does the influence of these factors distinguish between academics and scientists in general and the specific sub-group of engineers?*

In order to answer these sub-questions, I will use the theory of talent mobility to answer the first one. To answer the second question, I will analyze the situation of the German economy and its needs. To give an answer to the third question, I will look at quantitative data from the report *‘Wissenschaft weltoffen’* published by the German Academic Exchange Service (DAAD) and the Higher Education Information System (HIS). For the fourth question, I will perform interviews with experts from different interest groups, the German government, research institutes and foundations while putting special emphasis on other possible factors influencing the mobility of foreign academics and scientists. These interviews will also help to provide an answer to the final question with a special emphasis on the sub-group of engineers.

The next section gives an overview about the existing literature about the migration of highly skilled personnel. Then, I will describe the theory of talent mobility and explain the different factors that influence the migration of academics, scientists and engineers. Further, I will explain the development of legal provisions regarding the immigration of academics from third countries that exist in Germany and in the EU. Here, I put special emphasis on the reform of the Immigration Act (Zuwanderungsgesetz) in 2005 and on the Blue Card Initiative of the EU. After explaining the legal provisions, I will describe in my methodological part which data I am going to use. In addition, I give a short overview about the different institutions and organizations I have asked during my study. Then, I analyze the data from *‘Wissenschaft weltoffen’* about academics from third countries in Germany between 2002 and 2012. In the next section, I will present my findings from the interviews. Afterwards, I will conclude my findings and discuss ideas about further research in relationship to my thesis.

2. Migration of highly skilled personnel in the literature

The following section of my bachelor thesis describes the existing literature about the mobility of highly qualified professionals. I will explain the difficulties to find a clear concept to identify highly skilled personnel. This section takes geographical factors into account and mentions the different groups of highly skilled labor studied in the literature. Furthermore, I will pay special attention to literature which describes motivation driving the mobility of academics and scientists.

From the literature on the immigration of highly skilled personnel, it becomes obvious that there are various definitions of qualified or highly skilled personnel. For Morano-Foadi (2005) persons who have obtained tertiary degree or have equivalent experience in an academic field can be considered as 'high skilled'. Salt (1997) mentions that persons who have acquired qualification through long time working experience can also be considered as highly skilled, but it is difficult to precisely define what kind of experience can be regarded to develop these 'high skills' (Salt, 1997). Also international organizations like the OECD made efforts to define high skilled personnel. The OECD established four categories to classify highly skilled personnel: (1) by activity, (2) sector, (3) by occupation, and (4) by qualification (OECD, 1998). Whereas, qualification and education have been used for a long time to identify high skills, in the recent past these categories were supplemented by the collection and analysis of data considering a person's occupation or sector of employment. The possibility to combine these categories made it easier to identify skill levels for different kinds of jobs (Mahroum, 2000).

Despite the difficulties to deliver a clear concept to define highly skilled personnel, literature dealing with the migration of talented people can be grouped into several categories (Morano-Foadi, 2005). Thus, we are able to identify literature that focuses on the inward and outward flows of high skilled persons for different countries (Salt, 1997). Moreover, some authors focus in their studies on specific highly skilled categories or professions, e.g. Miller et al. (1998) on medical professionals, Beaverstock (1994) on bankers and employees in the financial sector, and Mahroum (1998) on scientists and academics. In addition, there are various studies analyzing the impact on the sending countries as well as the target countries. On the one hand, Bhagwati (1979) examined the impact of scientists' emigration for the sending countries. On the other hand, North (1995) focused on the effects of the immigration of highly skilled professionals for the target countries.

Furthermore, in the literature there exist some distinctions with regard to the geographical mobility of highly qualified manpower (Morano-Foadi, 2005). Due to this, we are able to identify an internal mobility within a country or external mobility outside a country. In addition, Morano-Foadi (2005) speaks about an intra-European mobility or migration and stated, with reference to the labor market, that there are movements between the public sector, like universities or public research institutes, and the industry. But, in accordance to Morano-Foadi (2005), these movements can also occur within the industry or the within the public research sector. This form of mobility is often caused by occupational changes or movements within a certain company. Based on this, various lengths of geographical mobility can be identified, like short-term moves, long-term moves or permanent stays (Morano-Foadi, 2005, p. 136).

Mahroum (2000) argues that the dynamics of migration among highly skilled professionals do not vary only among different professions, but also among the type of work. According to Mahroum, there exist different types of professions among highly skilled personnel and thus, the push and pull factors for migration are various. For example, the motivation for a scientist might be personal aspiration or scientific curiosity, whereas the motivation for a business manager might be a simply reflection of the employer's priorities. Therefore, Mahroum distinguishes between five major groups of professions, namely (1) senior managers and executives, (2) engineers and technicians, (3) scientists and academics, (4) entrepreneurs, and (5) students (Mahroum, 2000). Because, I am interested in the group of scientists and academics as well as the group of engineers and technicians, I will only mention the motivations for these target groups.

In the scientific community, international contacts between scientists from different countries existed for centuries and are a normal part of scientific life. The movement of scientists is regarded as a bottom-up process, which is responsible for the development and diffusion of new scientific ideas (Mahroum, 2000). Furthermore, science requires face-to-face contact between scientists and physical mobility to transfer ideas and research findings. For example, it is assumed that the transfer across the Atlantic Ocean between USA and Europe was more useful for the deployment of new US physics "than the same amount of money spent for acquisition of scientific literature" (Fischer, 1996, p. 3). On the one hand, scientific mobility improves the credibility of scientists in a new environment and, on the other hand, the hosting side enhances their credibility. Based on this, we are able to say that the mobility of scientists is a networking process that develops and extends a social space and therefore, can be regarded as a professional socialization among scientists.

Nevertheless, the mobility of scientists and academics strongly depends on the prestige of a certain institution and on the attraction of a country in a particular discipline. That means, a country might be famous for a particular discipline and therefore has collectively a positive reputation. This causes that the country becomes attractive for scientists in this discipline around the globe. The prestige of a certain institution can also be used to attract the best scientists in the world. For example, scientists are attracted by expertise and thus, by institutions that offer this expertise. Furthermore, modern science depends on trust and scientists tend to put their trust into organizations or institutions that are highly reputed for quality, originality and excellence (Shapin, 1998). Hence, the attraction depends on the possession of certain quantities that vary from organization to organization and "(...) which are often difficult to assess from the outside" (Mahroum, 2000, p. 27). Based on this, the reputation and prestige of an institution plays a crucial role within the judgment from outside. In addition, the reputation and prestige of an institution or organization can be enhanced by a 'star' scientist who increased the attractiveness for foreign scientists.

Regarding engineers the migration is strongly affected by labor and industrial policies of governments and immigration policies. Mahroum describes this group as *Economy-Class Passengers* because these talented people are 'pushed' and 'pulled' by economic factors (Mahroum, 2000). The decision to migrate or attract foreign engineers or technicians made by the individuals, firms or governments is strongly related to supply and demand factors of the labor market. However, the individual chooses the country where its skills are needed

and mostly rewarded. In the literature, it is believed that this group is more accountable than any other highly skilled group for the national economy (Salt & Clarke, 1998). However, some authors (Gover & Huray, 1998) argue that the immigration of engineers and technicians harms the natural balance between supply and demand on the local labor market. Nevertheless, many other authors (e.g. Miller et al., 1998) believe, that the effects of immigration of engineers and technicians bring overall more benefits than losses for a destination country because foreign engineers do not substitute local talent but complement them due to cultural exchange.

Moreover, governmental policies can play a key role to attract or motivate highly skilled personnel to move or stay abroad. Policies can offer incentives to make certain locations or industry sectors attractive and tax incentive, wages or a good infrastructure can influence the flow of foreign highly skilled labor force. Additionally, personal reasons such as desire or marriage can be important for the choice made by an individual (Mahroum, 2000).

Also within the literature about the migration of highly skilled professionals, the structure of the *National Innovation Systems* (NIS) is regarded as important for shaping outflows and inflows of academics, scientists and engineers (Mahroum, 2000). For instances, when the NIS of a specific country is located around universities, it will attract primarily academics from abroad, because activities regarding science and technology will take place at that universities. In contrast, when a country provides attractive conditions for foreign direct investments (FDI), many expatriate professionals will inflow to this country due to internal mobility within international companies.

Taking the last section into account it becomes clear that there is no clear concept of highly skilled personnel. However, the four categories of the OECD indicate that a highly skilled person has usually tertiary education or has acquired special qualifications through working experience. Moreover, it became obvious that there are many different studies about the migration of highly skilled personnel. Some of them focus on specific categories or professions, like Beaverstock (1994) and Mahroum (1998), whereas others like Bhagwati (1979) and North (1995) are interested in the impact and effects of highly skilled migration for the sending and target countries. In addition, other authors like Morano-Foadi (2005) examine the geographical mobility. Moreover, Mahroum (2000) stated that there are different factors that affect the migration of highly skilled professionals. For example, he mentioned the prestige of certain institutions or universities as the most important point why scientists migrate, whereas engineers are attracted by economic factors, like the demand of firms or companies. In addition, Mahroum (2000) found out that governmental policies and the *National Innovation System* (NIS) affect the migration of highly skilled personnel. In the next section, Mahroums' idea of the influence of different factors on the willingness to migrate will be picked up by using the theory of talent mobility by Solimano (2008).

3. Theoretical considerations - Talent Mobility

The topic of my bachelor thesis is strongly related to the mobility of qualified labor force or professional talents. Therefore, I will use the theory of talent mobility to provide an explanation for the international mobility of academic labor.

The mobility of highly skilled persons, like academics or scientists, is affected by several factors. According to Solimano`s theory (2008) on talent mobility, these factors can be grouped into seven categories:

1. International differences in earnings and development gaps.
2. Non-pecuniary motivations.
3. The demand for capital and talent.
4. Technology and the demand for talent.
5. Agglomeration and concentration effects.
6. Linguistic compatibility, networks, and socio-cultural affinity.
7. Policy regimes and immigration policies.

Due to certain time constraints, I will just concentrate on international differences in earnings and development gaps (1), agglomeration and concentration effects (5), linguistic compatibility, networks and socio-cultural affinity (6). I think that these factors might be most important in order to attract foreign academics and scientists to Germany. However, it is possible that during the interviews, I will find out that there are also other factors influencing the immigration of academics and scientists. Nevertheless, derived from the theory of talent mobility I think that the differences in earnings and development gaps, agglomeration and concentration effects, linguistic compatibility, networks and socio-cultural affinity and policy regimes and immigrations policies are most relevant for my topic. I think these categories are interesting because they seem most relevant for the current situation in Germany. First, regarding the differences in earnings and development gaps, it might be good to know more about the German position within the global competition among academics, scientists and engineers in terms of the salary. Second, the agglomeration and concentration effects are important because many other countries like the United States or Great Britain are very well known for their prestigious universities and I am interested in the role of such prestigious institutions in Germany in order to attract foreign highly skilled professionals. Third, analyzing linguistic compatibility, networks and socio-cultural affinity is of particular importance because in many attractive industrialized countries, like Canada, Australia or United States English is either the official language or widely used and most of the foreign highly skilled migrants can speak English. Therefore, it might be interesting to see if foreign academics and scientists see the language as a barrier. Finally, regarding the immigration policies and policy regimes I want to see if the relatively new reform of the German Immigration Act can be seen as a success or not. This seems especially interesting because the German government and the industry put high hopes into this reform. Especially the question of how the reform has influenced the academic sub-group of engineers might be interesting because this group is very important for the German export-led economy. Based on this, I will start with the factor of policy regimes and immigration policies, followed by international differences in earnings and development gaps, agglomeration and concentration effects, linguistic compatibility as well as networks and

socio- cultural affinity. All these factors are, in accordance to the theory of talent mobility, affecting the migration of academics labor.

Policy regimes and immigration policies. In the literature about international mobility of labor, there is great emphasis on policy regimes and immigration policies. Based on this, policies can play a key role to attract or motivate highly qualified personnel to move or stay abroad. Policies can offer incentives to make certain location or industry sectors attractive, and tax or wage incentives can influence the flow of foreign highly skilled labor force (Mahroum, 2000).

Solimano stated that the policy regime in the target as well as in the home country are crucial within the decision-making process of highly skilled persons "(...) to stay, leave or return to their home countries" (Solimano, 2008, p. 9). Therefore, we can expect that ineffective policies with regard to poor business opportunities or low salaries at universities or research facilities cause macroeconomic volatility or other kind of economic problems. In such a case, the theory of talent mobility assumes that academics and scientists will resent the conditions and leave the country. Moreover, volatility, inflated bureaucracy and barriers for foreign direct investment directly hinder the effective use of human capital. In contrast, countries with a liberal and open policy regimes that establish interesting incentives for highly skilled professionals can substantially improve the inflows rate and lower the outflow rate of human capital. For example, entrepreneurs are attracted by a great variety of governmental policies in terms of visa, taxation protection and credit facilities, but also by human resources and a better stock option system. For example, Australia and Canada have legislations that allow entrepreneurs to immigrate if they fulfill certain 'minimum' standards in terms of their capital (Mahroum, 2000).

The theory of talent mobility states that migration policies of the receiving countries have a direct effect on the migration flows of academics and scientists by regulating the exit and entry of foreigners from a certain country. One important factor for the establishment of immigration policies is a shortage in the labor market. For example, the migration of engineers and technicians is strongly affected by immigration policies. Mahroum describes this group as *Economy-Class Passengers* because these highly skilled workers are 'pushed' and 'pulled' by economic factors (Mahroum, 2000). The decision to migrate or attract foreign engineers or technicians made by the governments is strongly related to supply and demand factors of the labor market. On the one hand, the demand for professionals within a world economy can cause that rich states liberalize their immigration policies to attract these talented people. On the other hand, these states make efforts to establish higher barriers for unskilled immigrants. According to Solimano, immigration policies are a tool to compete within the global competition among the best trained and skilled professionals and they have a substantial influence on the quantity of academics and scientists (Solimano, 2008). However, whether or not the assumption of Solimano (2008) is true might differ from policy to policy and from country to country. This bachelor thesis aims at analyzing whether or not Solimano's assumption about the influence of a country's immigration policies is correct by looking at Germany. In particular, the effects of the Immigration Act in 2005 will be examined and how the reform has influenced the conditions for foreign academics and scientists. The reform aimed at lowering the obstacles for foreign high qualified personnel to

come to Germany and be able to work there. I will display the central elements of this reform in more detail in the following chapter.

International differences in earnings and development gaps. The mobility of highly skilled professionals is closely associated with economic determinants, like differences in wage levels and earning opportunities. These determinants are essential in driving people to move from one country or region to another. Hence, people are attracted by a higher income and thus, a higher income causes mobility across cities, sectors and countries or regions. Solimano (2008) stated that this is especially applicable for highly skilled professionals, who are directly involved in classic profit-driven sectors (e.g. entrepreneurs or managers), but also for scientists and academics.

For example, when a professor in computer science at a Romanian research institute or university has an income that is essential lower than an income he can earn in Norway, we can expect that he will move to Norway due to the very attractive salary. In general, that means the international mobility of highly skilled persons depends on the expected income differential between the income at home and the expected income abroad. Therefore, large differences among the net income prompt the emigration to wealthier countries that offer a higher salary. Based on this, we are able to identify a connection between development gaps, which refer to differences in living standards and productive potential among countries, and the direction and number of highly skilled migrants. The flow of highly qualified migrants usually occurs from countries with a low level of development to higher developed countries, whereas development gaps can appear in various forms, for example in the growth rates of countries. In accordance to Solimano (2008), differences in terms of growth rates cause differences in living standards and per capital income. In this regard, countries with a lower average wage are more often affected by outflows of professionals than countries with a high average wage. In addition, the outflow of highly skilled persons can deepen the development gaps while provoking negative effects for the domestic economy (Bhagwati, 1979). Regarding the case of Germany, the country is generally attributed to the high developed countries with a high standard of living. Therefore, I assume that the salary for high qualified personnel is relatively high in comparison to other countries.

Agglomeration and concentration effects. Usually, talented individuals are attracted by other talented people. In my case, this can be analyzed by looking at scientists and academics. They are not solely attracted by the chances of a higher income abroad, but also by the possibility to interact with well qualified and recognized peers (Solimano, 2008). Therefore, scholars and scientists prefer prestigious universities or research facilities. Mostly, these facilities are located in areas, which have sufficient resources so that scientists are able to do their research. Therefore, we can observe that they are attracted by specific areas or countries because of the concentration of other scientists, research areas and financial resources (Morano-Foadi, 2005). For example, the city of Cambridge in Massachusetts can be regarded as such a location because it concentrates the Harvard University and the Massachusetts Institute of Technology (MIT). But also in Germany there exist similar concentrated areas, for example in Stuttgart where regional universities are working together with the industry. Therefore, I state the hypothesis that agglomeration and concentration effects play a crucial role for foreign academics, scientists and engineers to come to Germany.

Linguistic compatibility, networks and socio-cultural affinity. Cultural traits, codes of social behaviors and the language are often regarded as obstacles for the immigration of people. Nevertheless, highly skilled persons are not so much concerned by these thoughts than lower educated people (Solimano, 2008) because they can often speak more than one language and show a greater awareness of cultural differences across nations. Nevertheless, the language spoken in a target country is still very important, also for academics and scientists. For example, Canada, the USA, Great Britain and Australia are very popular among academics and scientists whereas in Germany the language remains still an important obstacle for the emigration. Thus, the linguistic compatibility might be an obstacle for foreign academics and scientists to come to Germany.

A possible starting point for the international mobility of academics and scientists are exchange programs of foreign universities that help to study abroad. Often alumni and former students, who have studied abroad, form Diaspora organizations or networks, which help other students, academics or scientists to study or work abroad. Therefore, Diaspora networks set up linkages and connections between highly skilled individuals and their home countries through networks. These networks allow the exchange of information and knowledge between the expatriates and the home countries. Thus, the Diaspora networks establish the possibility that the expatriates are able to transfer skills and expertise back to their home countries without returning home (Brown, 2002). This brings the opportunity that developing countries gain from highly qualified natives who live abroad. However, an effective system of information plays a crucial role within the Diaspora network to ensure the exchange and transfer of information between the country of origin and the network members. Hence, the development of new information technologies is very important in order to facilitate the transfer of information and knowledge across different parts of the world. Due to the fact that in the last years Germany's engagement in student mobility has brought an improvement in the number of international students coming to Germany, I assume that there exist various networks that influence the immigration of foreign academics and scientists to Germany.

In summary, based on the previous mentioned factors, I will test the following hypotheses:

The reform of the German Immigration Act in 2005 has improved the conditions for foreign academics and scientists in Germany.

International differences in earnings and development gaps, agglomeration and concentration effects as well as networks play a crucial role for foreign academics and scientists to come to Germany.

Linguistic compatibility and socio-cultural affinity still function as hurdles for foreign academics and scientists to come to Germany.

As mentioned before, engineers and technicians are mentioned as a specific sub-group influenced by these factors differently. For example, they are more vulnerable to the international and national labor market situation and certain migration policies. Further, in Germany they are more likely to work in the private sector or economy exposed to other

conditions than academics and scientists that are more likely to work in public universities and research facilities. Based on this argumentation, the following hypothesis is assumed:

International differences in earnings and development gaps, policy regimes and immigration policies as well as agglomeration and concentration effects are even more important to the specific sub-group of engineers and technicians than academics and scientists in general.

4. Legal provisions for the immigration of highly skilled academics and scientists from third countries to Germany

4.1. From the recruitment ban to the new Immigration Act (1973- 2004)

The legal provisions for the immigration of highly skilled academics and scientists from third countries were shaped by two main factors. First, in the 1950s and 1960s Germany recruited mainly unqualified immigrant workers until the economic crisis in the 1970s caused a recruitment ban and a low demand for low skilled workers. Second, the contemporary prevalence and importance of a knowledge-based society increased the great demand for highly skilled personnel nowadays.

Caused by the recruitment ban in 1973 it became nearly impossible for immigrants from third countries to come to Germany for the purpose of employment. However in the 1980s, there was a shortage of labor in certain sectors despite the relatively high unemployment rate. Thus, the German government decided to ease the recruitment ban in these sectors (Heß, 2009). In 1990, the so-called “Anwerbestoppausnahmereordnung (ASAV)” defined which sectors should be excluded from the recruitment ban. Based on this, the ASAV explicitly mentioned scientists who work within research and teaching facilities. Furthermore, persons holding a university degree or a degree from a technical college should be allowed to work in Germany when their employment and their qualifications were congruent with the public interest (ASAV, § 5 No. 2, 1990). Since 1998, there exists the possibility for companies to recruit foreign personnel internally. This was especially done by big companies that have facilities in many different countries.

In order to satisfy the demand for highly skilled labor in the telecommunication and information sector, in 2000 the German government established the so-called “Green Card” regulation. This “Green Card” regulation allowed highly skilled persons from third countries that are qualified regarding information and telecommunication technologies to work and live on Germany. In 2005, the Green Card regulation was replaced by the new Immigration Act (Zuwanderungsgesetz).

4.2. The Immigration Act 2005

In January 2005, the new German Immigration Act (Zuwanderungsgesetz) entered into force. The core of the Immigration Act is the Residence Act (AufenthG). The Immigration Law regulates the immigration to Germany with special emphasis on the receiving and integration ability. Moreover, the Immigration Act represents the interests of the German state with regards to economic and labor market policies (Heß, 2012).

Within the Immigration Act, the AufenthG regulates the employment and the integration of foreign employees in Germany. In accordance to the AufenthG the residence title of migrants can be distinguished between a temporary visa, a temporary residence permit and permanent residence permit.

A new element of the Immigration Act is that foreigners will only have to deal with one authority regarding work permits and residence permits. Nevertheless, the general recruitment ban, which represents restrictions in access to the labor market, remains valid. However, exceptions are made for individual occupational categories (Heß, 2009). Like in the case of the ASAV Article 5(2), the exceptions are granted when there is a public interest in an individual taking up employment (see Residence Act, Article 18 (4)). For highly skilled persons the Immigration Act made it easier to get a permanent residence permit by offering the possibility that highly skilled persons are able to obtain a settlement permit upon their arrival. Furthermore, family members of these highly skilled persons who come to Germany are entitled to take up employment. Article 18 of the AufenthG defines which persons are considered as highly qualified. Thus, in accordance to Article 18 of the AufenthG highly qualified persons are:

- Executive managers (Art. 18 (4))
- Persons in the field of science, research and development (Art. 18 (5))
- Journalists (Art.18 (8))
- IT- specialists and academics (Art. 18 (27))
- Executive employees (Art. 18 (28))
- Employees within international personnel exchange (Art. 18 (31))

Moreover, in 2008 the German government made certain reforms of the AufenthG. These reforms entered into force at the beginning of 2009 and implied a new law on the regulation of labor migration (Arbeitsmigrationssteuerungsgesetz). These new regulations allowed persons holding a German university degree to get a residence permit if they have a job offer. Furthermore, persons from third countries with a university degree that is officially recognized can get a residence permit if they have a job offer and have worked for a minimum of 2 years in their academic field (Heß, 2012)

With regard to Article 18, Article 19 of the AufenthG states the conditions that a highly qualified person needs to follow in order to receive a permanent resident permit. Based on this, a permanent resident permit can be granted if

- There is a concrete job offer (Article 18 (5))
- The integration into the German society is fulfilled (Article 19 (1))
- The person can earn their living without governmental grants (Article 19 (1))

The Aufenthaltsgesetz also implies regulations on scientists from third countries. Article 19 (2) stated under what circumstances a scientist has a qualification which is higher than average. In the case the qualification of the persons is questioned, scientific institutions and organizations have to write a statement about the work and the qualification of the scientist.

In addition, the Aufenthaltsgesetz under Article 20 provides regulations for researchers from third countries. A residence permit will be granted to researchers who work at a research facility that is recognized by the Federal Office for Migration and Refugees. The Federal Office for Migration and Refugees agrees on a simplified visa procedure when there is an “admission agreement” between the foreign academic and the research facility. The simplified visa procedure does not require the involvement of foreign authorities. This statutory rule of Article 20 was a consequence of the EU Council Directive 2005/71/EC (Research Directive) and was transferred into the Aufenthaltsgesetz on 29 August of 2007. Concerning the mobility within the European Union, a researcher holding a residence permit from another member state can receive a residence permit or visa for Germany in order to carry out research in Germany. Moreover, these researchers are exempted from paying visa fees (Federal Office for Migration and Refugees, 2012).

4.3. The Blue Card

In October 2007, the European Commission presented the first proposal for a directive concerning the migration of highly skilled persons. In 2009, the directive 2009/50/EC was adopted under the legal basis of Article 63 (3) (a) and 64(4) TEC. However, Denmark, Ireland and the United Kingdom have opted out from the application.

The Directive 2009/50/EC, also known as Blue Card Directive, was initiated to stimulate the demand of highly skilled personnel to increase the competitiveness in the EU and the high standard of living. In accordance to the Commission’s Staff Working Document (2007), especially highly skilled persons within the sectors of information technology, healthcare, engineering, pharmaceutical and education should be attracted by the Blue Card (COM, 2007). Based on this, the Blue Card was meant to develop an attractive system for the EU to compete with other economic powers like the USA, Canada and Japan for a qualified labor force.

Therefore, the Blue Card Directive provides a scheme for strengthening the innovative economy within the EU while establishing a legal background for legal migration. Hence, the Blue Card can be understood as a support for reaching the objectives of the Lisbon strategy regarding the creation of a knowledge-based economy. Further, the Directive refers to the principle of subsidiarity because the member states themselves set the quota for Blue Card holders driven by their own demand.

In Germany the Directive 2009/50/EC was implemented into national law on August 2012. The implementation into national law of the Directive 2009/50/EC was done by amending the Article 19 of the Aufenthaltsgesetz. The Blue Card is limited to one up to four years and the holder should draw an equal wage like an EU citizen in a similar position. In Germany that means that the amount of the wage, mentioned in Article 19a (1) of the Aufenthaltsgesetz, needs to

be two thirds of the assessment ceiling of the social pension scheme. That means at least a wage of 44 800 € per year. In addition, there exist certain sectors where only 52% of the assessment ceiling of the social pension scheme is required (34.944 € per year).

4.4. Recent development and future challenges

In the year 2011 a report from the OECD (2011) stated that the number of highly skilled persons in Germany has decreased enormously. In accordance to the OECD (2011), the number of the older age group of professionals that will leave the labor market in the next years counts for 6.3%, whereas only 3.1% of qualified persons in the younger age group will enter the labor market. This development is caused by slowly growing numbers of highly educated people. Hence, the number of people with tertiary education within the age group of 55-64 is 2.46 million. The number of people with tertiary education within the age group of 25-34 is with 2.48 million, only marginally higher (OECD, 2011). Meanwhile, the number of people with a tertiary education more than doubled in all 36 OECD countries.

During the 1970s Germany was faced with structural changes within its national economy. The structural changes from a classical industrial economy to a knowledge-based economy led to a growing demand for highly skilled persons and a decreased demand for untrained employees (Koppel et al., 2009).

This development together with the slowly growing number of highly skilled personnel caused that the salary for highly educated persons has risen rapidly in Germany. For example, from 2005 to 2010 more than 12% of all academics in Germany went into retirement and needed to be replaced (Bonin et al., 2007). The opportunities for young academics to find a job in Germany were never before that positive (OECD, 2011). In the global crisis, Germany and Australia were the only countries where the demand for employees with tertiary education has increased. In Germany between 2008 and 2009 the employment rate of tertiary educated people increased by 0.6%. Also the number of employed academics has increased since 2009 (OECD, 2011). The unemployment rate of tertiary educated people has decreased to 3.4% in 2011, in contrast to 5.7% in 1997. Furthermore, like in all OECD countries, the overall number of people with a higher education has doubled since 1995 to 29%. However, this number is obviously under the OECD average of 39%.

Taking all this into account it became clear that due to the demographic change and the only slightly growing number of highly skilled people, Germany is no longer able to cover its economic demand for qualified labor. This can be especially observed within the technical sector of an export-led economy. This affects particularly the STEM field (science, technology, engineering and mathematics), where a decrease in numbers can be recognized. Between 1995 and 2006 the annual number of people receiving a degree in engineering decreased from 50,612 to 39,129 (Statistisches Bundesamt, 2008). The annual number of physics shrank from 14,980 in 1995 to 11,113 in 2006. Furthermore, the number of engineers of all graduates holding a engineering degree decreased from 23.6% to 15.4% (Koppel et al., 2009, p.8).

In the long term this will have serious consequences for the German labor market and the economy. Therefore, in 2027 and 2028 more than 100,000 highly skilled persons will go into retirement that cannot be replaced and therefore the lack of highly skilled persons, especially academics, will increase from 2020 to 2030 to around 900,000 persons (Koppel et al., 2009, p. 37).

5. Methodology

In order to give an answer to the research questions, I will use quantitative as well as qualitative data. Quantitative data about the number of foreign academics and scientists in Germany will be gathered from the publications of "*Wissenschaft weltoffen*", a joint project of the German Academic Exchange Service (DAAD) and the HIS-Institute for Research on Higher Education that presents amongst others data about the mobility of foreign academics and researchers in Germany. Data about foreign academics and researchers can be found for the period from 2002 to 2012. However, there are some statistical thresholds to this data that should be mentioned. First, there is no only organization in Germany, which centrally collects and analyses data on the exchange of academics and researchers in a standardized manner. Further, scientific and research organizations do not necessarily record their data about their funding activities relating to the exchange of academics and scientists. Therefore, there is only limited access to this kind of data. Currently, the HIS-Institute and DAAD is able to get data from about 40 scientific and research organizations dealing with the directly funded exchange of academics and researchers. That means that this data presented here only provides information on some exchanged academics and scientists, the reality might demonstrate a much more positive picture in terms of the number of foreign academics and researchers in Germany.

Qualitative data can be a very interesting source of information, especially in fields where the researcher is interested in an explanation of the numeric data. Therefore, expert interviews can help to test the hypotheses of the theory of talent mobility in order to share some light on the complex decision-making process of foreign academics and scientists to come to Germany. All in all, interviews were conducted with six experts. An expert is a person with a high degree of skill in or knowledge of a certain subject, in this case the mobility of foreign academics and scientists. Bogner et al. characterizes an expert as a person with a "technical process oriented and interpretive knowledge referring to their specific professional sphere of activity" (Bogner et al., 2009, p.46). Thus, an expert has not only a systematized and reflexively accessible specialist knowledge but also practical knowledge. Therefore, an expert opinion can be regarded as relevant because "the experts' knowledge structures the practical conditions of other actors in their professional field in a substantial way" (Bogner et al., 2009, p.46).

According to this definition, experts from the following institutions were interviewed:

- VDI (Verein Deutscher Ingenieure – the Association of German Engineers):
- Humboldt-Stiftung (Humboldt-Foundation)
- Konrad-Adenauer Stiftung (Konrad- Adenauer Foundation)
- HIS-HF (Hochschul Informations System - Institute for Research on Higher Education)
- Federal Office for Migration and Refugees
- DFG (Deutsche Forschungsgemeinschaft - German Research Association)

6. Data and analysis

This part of my bachelor thesis contains quantitative data concerning academics and scientists from third countries that work at German institutions, research facilities and universities. For this purpose, I will use data from the reports *“Wissenschaft weltoffen”* published by the DAAD and HIS for the time period from 2002 to 2012. In addition, I present data from the *“monitorING”* published by the VDI about the total number of foreign engineers that work in Germany. My interest is to see if the German Immigration Act in 2005 has an influence on the numbers of scientists, academics and engineers. However, I have to mention that the data from the reports *“Wissenschaft weltoffen”* does not provide a complete overview of all third-country academics, scientists and researchers in Germany because there is no central organization in Germany that collects data on foreign academics, researchers and scientists on standardized criteria. This is based on that the national Statistical Offices are not required to record the data because it is not anchored in the Hochschulstatistikgesetz (Wissenschaft weltoffen, 2012). The reports from HIS and DAAD use data from over 40 scientific and research organizations that fund the exchange of foreign academics and/or finance research. Every year, HIS and DAAD ask these research organizations to provide information on the specific academics and scientists they are funding in the year at hand. It should be mentioned that most of these funded researchers work in a publicly funded research institution or higher education institution during their stay in Germany. Thus, the data set is far from being complete because it is not possible to include data about privately financed research and stays by foreign academics and scientists. However, it provides an overview about the total amount of foreign academics that are funded by these 40 research organizations which can be seen as appropriate to indicate a certain trend in Germany. Furthermore, the reports cover the time period between 2002 and 2012, but the data sets are from 2000 to 2010. That means every report refers to data that is two years old. When referring to data concerning foreign academics and scientists from Europe, data is concentrated from countries in Eastern and Western Europe, which means these countries mostly belongs to the EU or the SCHENGEN Area. Thus, I will just look at data of Turkey, Ukraine and Russia for Europe in figure 1 and 2. Figure 3 shows the length of stay for all foreign academics, scientists and engineers including EU citizens. Figure 4 shows data from the *“monitorING”* about the number of all engineers that work in Germany with a foreign citizenship including EU-citizens. It should be taken into account that despite their non-

German nationality, these engineers might have been grown up in Germany and received their secondary school certificate in Germany.

6.1. Quantitative data from Wissenschaft weltoffen (2002-2012)

By looking at figure 1 it become obvious that the number of academics, scientists and researchers has steadily increased. Between 2002 and 2012 the number has almost doubled from 10,806 to 19,620. Moreover, a substantial increase took place between 2007 (14,156 foreign scientists) to 2012 (19,620 scientists). If we take into account that the data of 2007 is drawn from the year of 2005, when the Immigration Act entered into force, it could be stated that:

Since the adoption of the Immigration Act in 2005 the number of academics, scientists and researchers has increased in accordance to data sets collected by the DAAD and HIS.

Notwithstanding it is difficult to conclude a causal relation between the implementation of the Immigration Act and the increase in numbers of foreign academics, scientists and researchers from third countries. However, since the adoption a positive trend can be recognized and it is likely that this positive trend is influenced by the Immigration Act. Nevertheless, to get a closer view on the effects of the Immigration Act of 2005 regarding the number of academics, researchers and scientists, I have asked experts on their point of view about this question. The analysis of these interviews and the results can be found in part 6.2.

As I mentioned above, my bachelor thesis will also focus on engineers due to the fact that this specific sub-group of academics is crucial for the German export-oriented economy. Figure 2 shows that the number of engineers from third countries has increased until 2005 (1,836 persons in the field of engineering), but then there was a strong decrease in the next year to 1,263 persons. However, after this fall the number of engineers has doubled by 2012 to 2,526. Within this period it also seems very likely that the adoption of the Immigration Act in 2005 (2007) has positively influenced this development.

Figure 1: Numbers of academics and scientists from third countries in Germany between 2002 and 2012 (Including post docs and graduates)

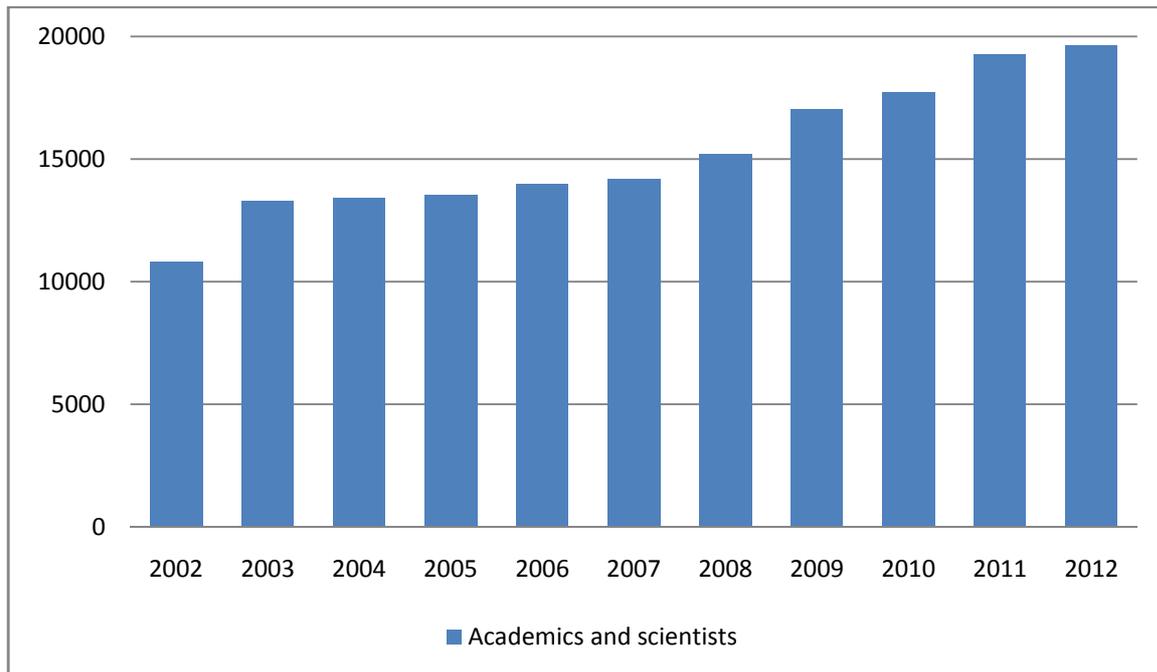


Figure 2: Numbers of engineers from third countries in Germany between 2002 and 2012 (including post docs and graduates)

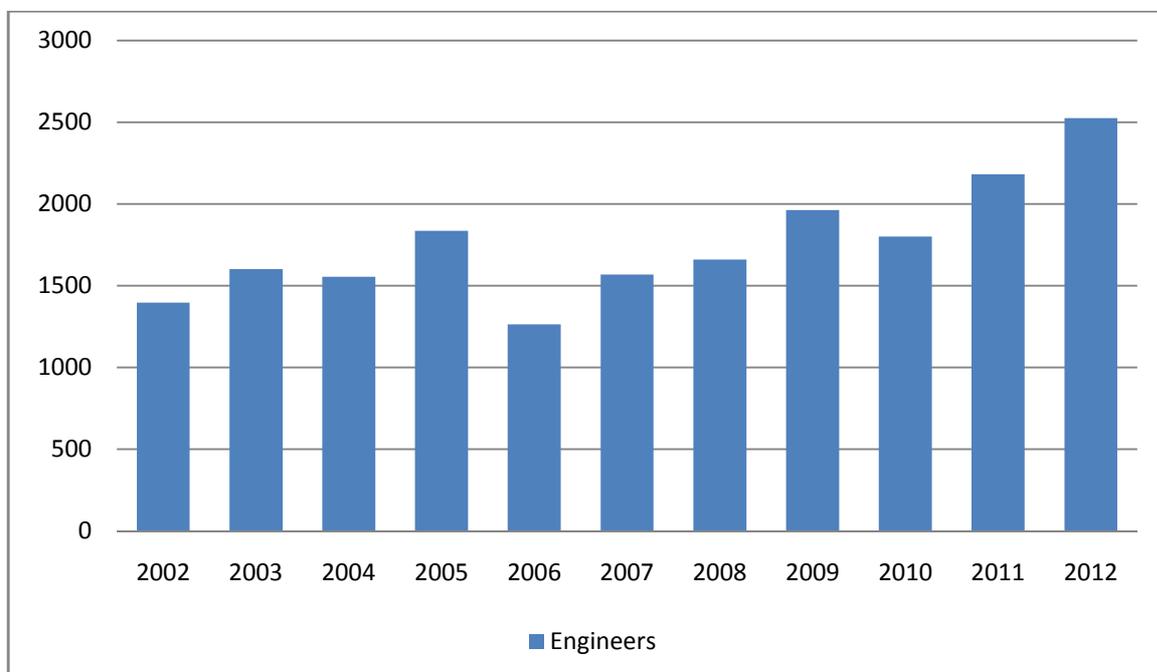
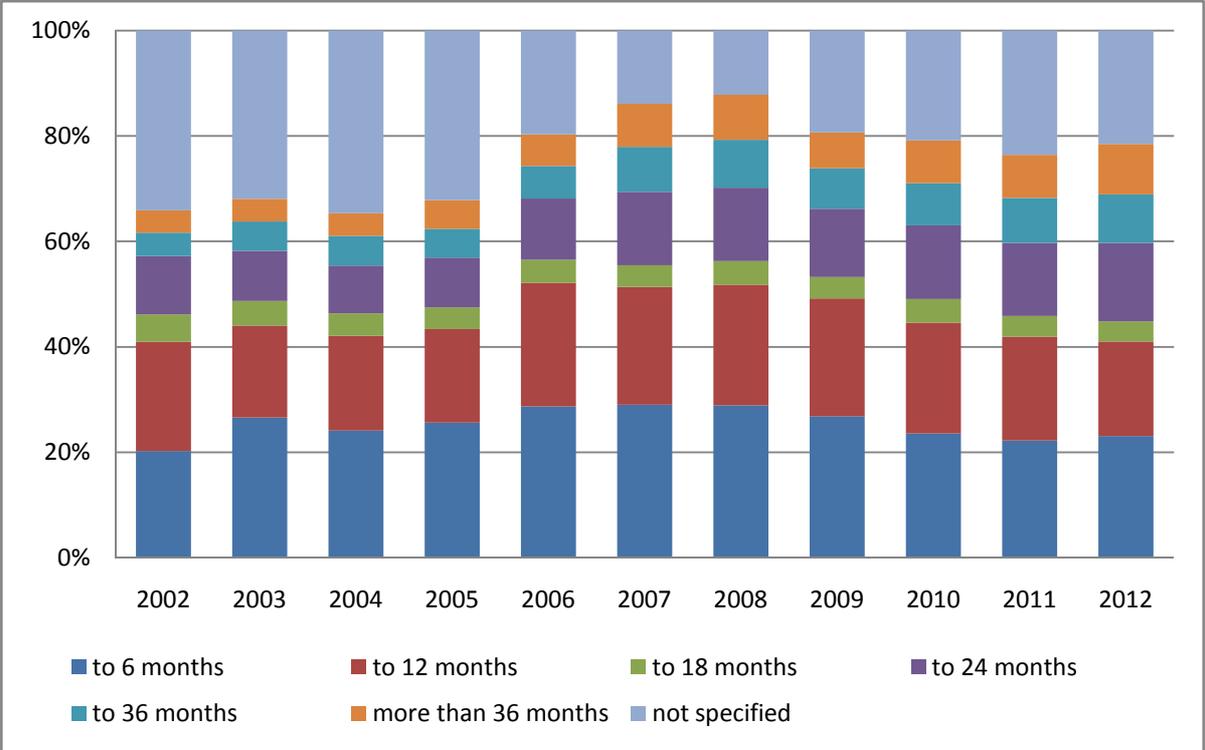


Figure 3 indicates that the length of stay has slightly changed during the last ten years. It could be recognized that there is an increasing trend for a longer period of stay. For example, in 2002 about 4.33% of all academics, scientists and engineers stayed longer than 36 months, whereas in 2012 the number has increased to 9.62%. Further in 2002, 11.14% of all academics, scientists and engineers stayed between 18 to 24 months in Germany. In contrast, in 2012, this number has increased to 14.92%. However, it is impossible to say if since the reform of Immigration Act the period of stay has increased because the percentage of unspecified foreign academics, scientists and engineers has decreased from 34.12% in 2002 to 21.48% in 2012. Thus, it could be possible that the unspecified data in 2002 could include a great number of long-term stays.

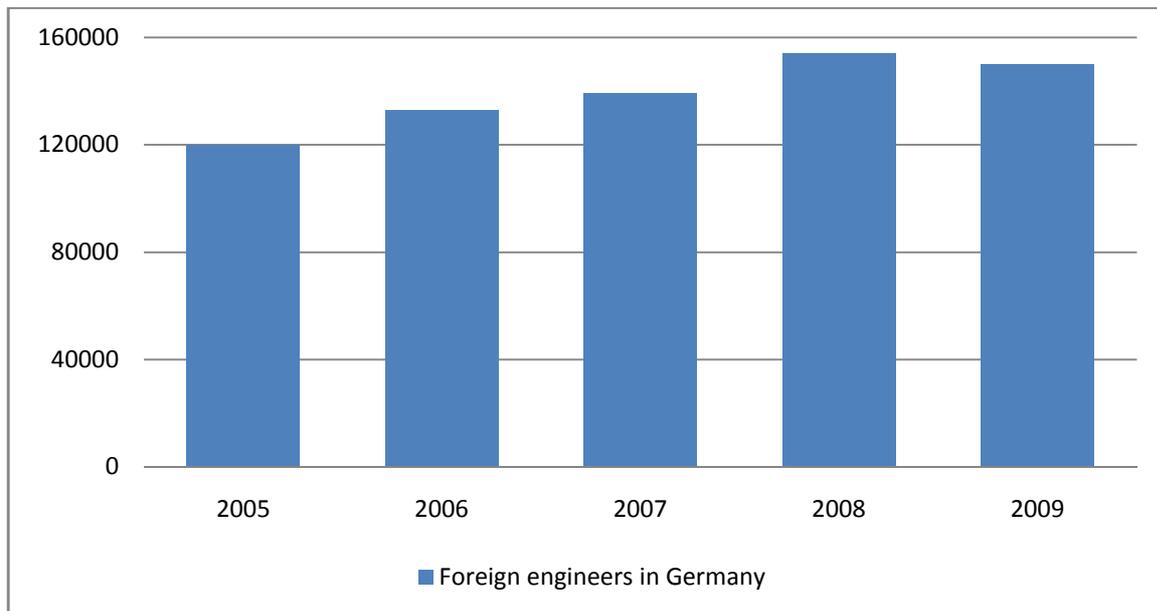
Figure 3: Foreign academics, scientists and engineers in Germany between 2002 and 2012, by length of stay²



In figure 4 it can be observed that between 2005 and 2009 the number of foreign engineers in Germany has increased from 120,000 to 150,000 persons. In percentages that means there was a growth of 20%. It seems likely that the reform of the Immigration Act in 2005 has influenced this positive development, but we must carefully handle this data due to the fact that EU citizens are included. There exists the possibility that the increase can only be attributed to EU citizens. However, this seems very unlikely and it can be assumed that the reform of the Immigration act in 2005 had a positive effect on the numbers of engineers from third countries.

² Stays of 1 month and more are registered.

Figure 4: Number of foreign engineers in Germany between 2005 and 2009 (including EU citizens and foreign students who received a secondary school certificate in Germany)



6.2. Analysis of the interviews with experts

In the following section, the interviews with the experts from institutions concerned with the mobility of foreign academics and scientists will be analyzed according to the factors of the theory of talent mobility that are assumed to influence the likelihood of foreign academics and scientists from third countries to come to Germany. In each section, I will present one factor describing first, the general assumptions about this topic made by the experts and second, the influence of this specific factor for the sub-group of engineers.

6.2.1. Policy regimes and immigration policies

In the interviews, I ask explicitly for the reform of the Immigration Act of 2005 and for the Blue Card initiative. Regarding the reform of the Immigration Act it was confirmed by all interview partners that the law has brought a great improvement for the migration of academics, scientists and engineers. It was stated that after the reform more academics have come to Germany and that the numbers of migrants with tertiary education has increased. Moreover, the reform was an important cornerstone to establish conditions that allow academic migrants to stay permanently in Germany instead of leaving the country after a few years. In addition, the reform increased the number of requests of academics and scientists as well as engineers about the possibilities to work in Germany. The experts mentioned that the reform of the Immigration Act was a step which was necessary and long overdue. Nevertheless, despite the legal aspects, the reform was an important signal because it showed that Germany officially wants to attract highly qualified foreigners.

However, it was mentioned that the reform of the Immigration Act can be seen as a part of various laws and legal implementations that took place in the last 15 years. Thus, also the

Bologna Process was essential because it introduced the bachelor and master system while establishing certain standards and made a comparison of university degrees much easier. In addition, the interview partners mentioned that especially the Blue Card initiative can be seen as a supplementation for the Immigration Act.

My interview partners said that they expect that the Blue Card will allow a better access to the German labor market for highly skilled persons from third countries. Especially within the engineering sector, the Blue Card can help Chinese, Indian or Latin American engineers to immigrate to Germany, but the experts did not expect an enormous incensement by numbers of engineers caused by the Blue Card. This opinion is grounded on the factor that Germany is still lacking behind other countries in terms of its attractiveness. Nevertheless, the implementation of various laws was not able to cover the enormous demand for engineers, thus the European engineering organizations have become active. A good example is the introduction of the "Engineering Card" by different European engineering organizations. The "Engineering Card" is a card, which provides a Europe-wide transparent overview about the work experience and the study degree of engineers and allows that the employer get a quick overview what the potential employees has do so far.

6.2.2. International differences in earnings and development gaps

The salary is an important factor for academics and scientists to come to Germany. My interview partners stated that the salary in Germany can be regarded as one of the main reasons why academics and scientists from third countries come to Germany. However, one interview partner mentioned the salary as important, but the main motivation for scientists and academics is the valuation and respect of their work. Another one said that especially the availability of qualified staff is essential and the salary plays only a secondary role for foreign scientists. The salary in Germany is relatively high, but in contrast to other countries like the United States or Great Britain, most researchers are employed in the public service. That means that their salary is bound to pay scales and cannot exceed a certain maximum. Furthermore, the tax rate in Germany is higher than in other countries that negatively affects the net salary. Another problem by looking at the income of academics and scientists are the obligations where German universities are bound to. In accordance to one expert, German universities are not allowed to offer an annual payment higher than 200.000 € for academics and scientists. In general this is not a problem because most of the university staff earns less than this amount but some international experts expect more than this amount. Only non-university institutions like the Max Planck Society are allowed to pay a higher salary for researchers and scientists. Thus, the flexibility regarding the salary has to be improved in Germany, especially at publicly funded universities and research institutions. It turned out that the possibility to get a social security and compulsory long term care insurance can be a very attractive factor for foreign scientists and academics to live in Germany, although these benefits are mostly perceived by the older generations than by young academics. The interview partners also mentioned positively the infrastructure in Germany. That means the good infrastructure in terms of health care, housing and transport has a certain influence on the decision for foreign academics and scientists to choose Germany as a destination. By one

interview partner it was stated that also the bureaucracy dealing with migration matters in Germany plays a role because it is in contrast to the United States much more effective.

Regarding engineers my interview partners stated that for this group the salary is a crucial factor for the decision to work in Germany. In accordance to the experts, engineers holding a bachelor degree have an average annual net salary of 40.000 € whereas engineers with a master degree earn a net salary 43.000 € when they start to work in Germany. Hence, in comparison to other EU countries like Great Britain and France, engineers receive in Germany a similar payment. Moreover, my interview partners said that the attraction of foreign engineers does not lead to a drop in payrolls because good trained professionals within the engineering sector know their value. To put it into a nutshell, during the interviews it turned out that for engineers from third countries the salary is more important than for academics and scientists in general. However, the infrastructure, which is mentioned as quite good in Germany, is for academics and scientists as well as engineers a positive criterion regarding the decision to choose Germany as a destination.

6.2.3. Agglomeration and concentration effects

In my interviews all interview partners agreed on the fact that the prestige of German universities and other research institutions is a significant positive stimulator for foreign academics and scientists. However, it turned out that German universities and institutions need to improve their international reputation and prestige. Especially the Excellence Initiative is seen as a good instrument to improve the prestige and reputation of German universities and institutions. The Excellence Initiative established by the German Federal Ministry of Education and Research and the German Research Foundation aims at the promotion of cutting-edge research and the creation of outstanding conditions for researchers and scientists at German universities. Furthermore, the initiative shall improve the international cooperation in terms of research and the exchange of institutions. To achieve these goals the German government provides funds of around 2.7 € billion for the next five years. Universities that would like to join the Excellence Initiative have to achieve certain standards. For the next five-year-term 11 German universities are part of the Excellence Initiative (DFG, 2012). Nevertheless, within international rankings like the Shanghai Ranking (2012) only four German universities are among the top 100 (Shanghai Ranking, 2012).

Despite the Excellence Initiative, it was mentioned that German universities shall further develop their internationalization strategies. For example, one interview partner acknowledges the establishment of German universities' branch offices abroad in order to enhance their visibility of their capacities. Whereas it came out the reputation of German universities needs to be improved, the experts mentioned positively the international reputation of certain non-university institutions like the Fraunhofer-Society, the Max-Planck-Society or the Helmholtz-Society. Therefore, the experts recommend the formation of so-called regional innovation clusters, which means the collaboration of these renowned non-university institutions with higher education institutions and industry in a certain region. The clusters might help to improve the international reputation and provide benefits for all

collaborating partners with the purpose of pooling the strength of a region and enhance their international competitiveness. A step into this direction was promoted by the “Joint Initiative for Research and Innovation”, a funding initiative of the Federal Government, the Federal States of Germany and the most important science and research organizations, like Max Planck Society, Leibniz Science Association and the German Research Association. The primary goal of this initiative is to increase the funding of science organizations in order to trigger dynamic developments in the science system, establish sustainable partnerships between science and industry and recruit top-ranked scientists from all over the globe to stay in Germany long-term (Federal Ministry of Education and Research, 2009).

However, my interview partners said that scientists who are specialized in a certain academic field are more interested in persons than in the prestige of an institution or university. That means usually foreign scientists are more attracted by the reputation of a professor than by the prestige of an institution or university. Furthermore, in the interviews it was mentioned that the migration of academics depends on the scientific field at hand and its respective mobility traditions. For example, post docs within the field of physics and chemistry are more willing to work at foreign institutions than post docs from social science.

For the group of engineers the prestige of universities and institutions is even more important than for academics and scientists in general. In accordance to my interview partners German universities like RWTH Aachen or the Technical University Munich have a worldwide reputation, and therefore, they are absolutely comparable with other world class universities, like the Massachusetts Institute of Technology (MIT). Thus the reputation of these universities plays a great role in attracting foreign engineers. However, not only the prestige of an institution or university affects the migration of foreign engineers but also the prestige and reputation of the entire German economy. This reputation is driven by certain companies that are famous in the world for their products. Examples that were mentioned are Bosch, Mercedes, Volkswagen or Bayer.

6.2.4. Linguistic compatibility, networks and socio-cultural affinity

My interview partners said, the predominance of the German language in German working and everyday life is a barrier for foreign academics and scientists to reside in Germany. All experts agreed on the fact that within the academic world English has become the common language. Based on this development, German universities and institutions are step-by-step striving towards introducing English into the German academic life, for example by means of English-taught classes and study programs. Today, the gross of German academics and scientists is able to speak English and therefore, in the working life, there should be no linguistic communication problems. However, the main problem for foreign academics and scientists remains the everyday life in Germany. These problems imply that a simple activity like buying bread is hard to manage for non-German speakers. Furthermore, the entire bureaucratic process in Germany is mainly managed in German. This is especially valid for the communication with the authorities, like at the registry office, but also for dealing with the administration at universities. Especially in the first weeks, in the “acclimatization-period”, these communication problems with bureaucratic institutions can be perceived as

frustrating. The experts argue for possible first steps to ease the efforts for foreign academics and researchers, like the provision of English websites for local agencies, or the employment of qualified English-speaking staff at governmental agencies. Moreover, the whole administration process at German universities should be organized bilingual, in German and English as well. In accordance to the interview partners these implementations would be relatively easy and cheap while removing substantial barriers for foreign academics and scientists.

Hence, the use of the German language in academic work declines more and more. For example, this can be recognized by looking at Eastern Europe, where German was for a long period a popular language for academics and scientists, whereas today it is observable that English has become the primary language of academics and scientists. However, some experts argue that instead of promoting English as the one academic language, another way to increase the visibility of Germany in the global academic world could be the promotion of the German language abroad. This would enhance the understanding of the German language and culture, especially in countries where the knowledge of Germany is limited like in Latin America for example. Hence, German schools or Goethe Institutions can function as ambassadors for Germany because in many cases they are the first connection to Germany for future and current foreign academics and scientists.

Regarding the socio-cultural affinity the experts just mentioned that this aspect is strongly connected to the language, however there could be recognized a strong interest from academics and scientists from Eastern Europe to come to Germany. Especially professionals from Ukraine, Belorussia and Russia are more attracted to Germany than to other countries like the United States or Australia. Nevertheless, the experts are very careful to say that this has to do with the socio-cultural affinity. It is more likely that the factor of geographical proximity between their home countries and Germany is regarded as beneficial, for example to visit family and friends at home on a more regular basis. In general, the experts said that within the last 20 years the world has become more and more globalized also in terms of culture. Thus, the cultural barriers disappear more and more.

In accordance to the experts networks are one of the most important factors to attract foreign academics and scientists. On the one hand, networks of foreign academics and scientists in Germany allow people that are willing to migrate to ask fellow countrymen about their experience in order to get advices and help. On the other hand, academic networks that foreign academics have established with other scientists in Germany are important. Thus, if foreign scientists return home, but keep in touch with fellow colleagues in Germany, they are more in favor to exchange their ideas and outcomes with each other. Furthermore, these scientists are willing to come to Germany to work on projects they have started during their previous stay. In addition, the experts said that also student networks are essential for the migration of foreign scientists and academics. The experts argue the sooner young foreigners are getting in touch with the possibilities to work or study in Germany, the more likely they will come. Young people have a greater willingness to migrate than older people who are already integrated in their working and family life. Therefore, early attempts to advertise for career opportunities in Germany are most successful for young migrants to get into touch with Germany. For example, by now many foreign students from China, Brazil or India

study and do internships in Germany. When they return home they often work for German companies in their home countries or go back to Germany for employment. This is especially the case for the group of engineers, where student networks are even more important than for academics in general. Around 17% of all engineering students are foreigners and most of them return home after they graduate. However, they are still connected to Germany via their networks and they properly tell other engineers in their home countries about Germany and about “German engineering”. So these engineers promote the German industry, universities and institutions despite that they are maybe willing to return to Germany for work. The experts said that especially these alumni networks were neglected during the last years and need to be more supported by German universities. The support of these networks is very cheap and easy because these networks help to get in touch with German universities, institutions or companies by word-of-mouth recommendations.

A good example, which connects the interaction between networks and language, is DANA established by the so-called TU9 universities. These TU9 universities (the best 9 technical universities in Germany) offer young people, who graduated from German schools that are abroad, to become a part of a network that offers information for prospective students of engineering at the TU9 universities (see TU9, 2012).

6.2.5. Additional factors for the migration of academics, scientists and engineers

In interviews the experts stated that the support for family members for academics needs to be improved. For example, if a foreign scientist works at a German research institution, there must exist the possibility that the marriage partner gets a job which is appropriate regarding the respective qualification. Furthermore, the whole family needs more support, for example, by finding a school for the children or by providing help within the bureaucratic process. Big German firms like Siemens or Eon have already programs to support their foreign academic employees when they come to work in Germany, but medium-sized businesses have not the capacity and the financial resources to provide such programs. Based on this the Government needs to offer programs especially for foreign academic employees at medium-sized businesses. A good way how universities can offer help for new foreign employees are so-called “Welcoming Centers” that help the migrants to start their new life in Germany. Another point mentioned by the experts is the enhancement of “Juniorprofessur”-jobs in Germany. These “Juniorprofessuren” offer academics at universities employment for an unlimited period of time after a probation period. Hence, the “Juniorprofessuren” offer the possibility to work and live in Germany for the whole life in contrast to limited contracts, which are not setting incentives to give up the old job in the foreign country and migrate to Germany. In addition, all interview partners said that also the society is responsible for the migration of academics, scientists and engineers because the migrants must feel welcome in Germany. Thus, the German society needs to build up a “Welcoming Culture” where migrants feel comfortable and are willing to stay in the country.

6.2.6. Concluding remarks: the general attractiveness of Germany for foreign academics, scientists and engineers

The experts said that the attractiveness of Germany has increased during the last ten years. In particular the conditions for research and science have improved and thus more academics and scientists are choosing Germany. One factor which has a positive influence on that is the Excellence Initiative, but also the Reform of Immigration Act of 2005 played a role. However, the interview partners mentioned that it is hard to make a general statement about the attractiveness of Germany for academics, scientists and engineers from third countries. On the one hand, the recent development showed that in particular academics and scientists from China, India, Russia or Turkey have a great interest to come to Germany and that Germany has caught up in terms of being an attractive destination compared with countries like Switzerland or France. But on the other hand, if we see the attractiveness of Germany in relationship to other attractive destination, like the United States, England, Australia and Canada, Germany is still lacking behind. This is in particular true for engineers because the competition among the best trained and skilled engineers takes place all over the globe. Thus, Germany is still not able to attract as many engineers as required by the industry and research facilities. Based on this the experts said that especially the support of networks is important because it can provide information for engineers about the conditions and requirements to come to Germany.

7. Conclusion

Germany takes part within a world-wide competition to attract foreign academics, scientists and engineers. The attraction of these highly skilled persons is essential for the German industry, but also for Germany as a location of science and research. Thereby it competes with other very attractive countries, which have a long tradition as migration countries like the United States, Canada or Australia. In contrast to these countries the German government has only recently considered Germany as an immigration country and recognized the importance of attracting foreign academics, scientists and engineers. Hence, during the last decades Germany has a great need to catch up regarding this topic.

In my bachelor thesis, I described different measures and efforts that took place to improve the attractiveness of Germany for academics, scientists and engineers from third countries. On the one hand, the efficiency of legal provisions and laws that have been made by the governments of the EU and Germany were described and analyzed, like the reform of the Immigration Act of 2005 or the Blue Card Initiative and experts were asked about their point of view. On the other hand, I looked at factors like the salary, networks, socio-cultural affinity, linguistic compatibility, agglomeration and concentration effects and interviewed the experts about the importance of these factors for the migration of foreign academics, scientists and engineers. It turned out that all the different factors are important for the attraction of highly skilled professionals. Further, it can be stated that all the different factors are essential and the conditions improve when different measures are taken on different stages by different actors. In the following part I will test my hypotheses derived from the research questions.

Testing hypothesis 1: The reform of the German Immigration Act in 2005 has improved the conditions for foreign academics and scientists in Germany.

With regard to the reform of the Immigration Act all experts believed that it has improved the conditions for the academic immigration from third countries to Germany. The estimation of the experts is covered by looking at figure 1 and figure 2, where an increase in numbers can be observed since the reform of the Immigration Act in 2005. This seems also the case for the immigration of engineers by looking at figure 4. Since the reform of the Immigration Act in 2005, the numbers have increased by 20%. Thus, it is very likely that the reform of the Immigration Act in 2005 had indeed a positive impact on the attractiveness of Germany for academics, scientists and engineers from third countries. Nevertheless, the experts agreed that the reform was long overdue and that further steps must be made.

Based on this, I can confirm hypothesis 1, although the long-term effects of the reform must be observed in the future.

Testing hypothesis 2: International differences in earnings and development gaps, agglomeration and concentration effects as well as networks play a crucial role for foreign academics and scientists to come to Germany.

The salary and the development gaps are important for the immigration of foreign academics and scientists. Some interview partners argued that the valuation of their work and good research conditions play a more important role for scientists than the salary. However, in order to be able to attract foreign scientists and researchers with a high international reputation, universities should be allowed to pay more than 200,000 € per year. Indeed, there exist already exceptions, for example in the case when new professorships are established by the cooperation of publicly funded university and the private industry creating the opportunity to pay higher salaries. With regard to the development gaps it has become clear that the social benefits in Germany, like health insurance or the compulsory long term care insurance, have a positive influence on the migration of academics. These social benefits are, in particular, interesting for older foreign academics with a family.

The agglomeration and concentration effects were seen as essential cornerstones for the attraction of foreign academics and scientists. On the one hand, it became obvious that there were already certain programs successfully implemented, like the Excellence Initiative or the Joint Initiative for Research and Innovation, but, on the other hand, there is a need for further steps. As mentioned above, further measures might be the establishment of German university branch offices' abroad or the development of regional innovation clusters.

What surprised me the most when I performed the interviews was how important networks seem to be. It turned out that networks are crucial elements for the migration of foreign academics and scientists. Furthermore, it can be stated that there exist various types of networks, which are all important and need to be enhanced and supported. For example, the alumni networks play a great role because scientists are able to communicate with their former colleagues about their work and ideas. In addition, these scientists have contact

persons when they are willing to go back and can work as agents for their countrymen regarding internships or jobs. Well suited networks to attract young people to study in Germany are networks between the German schools abroad and German universities, like DANA. These kinds of networks imply a great chance that the students will work in Germany after they have graduated. The support of these networks is a good instrument to attract more highly skilled professionals to come to Germany. This support can be done by different actors, like universities or research institutions, but also by the individuals themselves. Another advantage of networks can be attributed in financial terms because they are relatively cheap to establish and to support.

In summary, I am able to confirm hypothesis 2 because next to the competitive salary, Germany possess various social benefits that are especially attractive for elderly academics with family. Further, the German government has recently started successful campaigns in order to improve the excellence and prestige of universities and research facilities. Finally, the influence of networks is even more important than previously expected and the experts advise a better support of these networks.

Testing hypothesis 3: Linguistic compatibility and socio-cultural affinity still function as hurdles for foreign academics and scientists to come to Germany.

In the interviews it became obvious that the linguistic compatibility has a great affect on the migration of academics and scientists. One can say, that the universities, but also governmental agencies, shall offer more bilingual programs that improve the conditions for non-German speaking migrants. In addition, the German government should enhance the support for German language centers abroad so that foreigners are able to get into touch with the German language and culture. On the one hand, language centers can function as ambassadors for Germany as a country, but, on the other hand, allow people to learn the language. The combination of language centers and bilingual programs might close the gap between working life and private life. For example, foreign scientists should be able to speak English at work and could use their basic German language skills they have learned in language centers in their home countries, to communicate in their daily life. Regarding cultural affinity the influence on the migration of academics and scientists seems very minor.

Hypothesis 3 can be partly confirmed. On the one hand, difficulties with the German language seem to be more a problem in the daily life. In the working life, most academics can use their English language abilities. On the other hand, the influence of the socio-cultural affinity can be neglected due to a more globalized world where cultural barriers and differences have diminished.

Testing hypothesis 4: International differences in earnings and development gaps, policy regimes and immigration policies as well as agglomeration and concentration effects are even more important to the specific sub-group of engineers and technicians than academics and scientists in general.

International differences in earnings are for engineers even more important than for the general group of academics and scientists. Due to fact that engineers are more often working in the private sector, their salaries are not limited to certain standards. Therefore, the industry can provide sufficient and competitive financial incentives in order to attract the best skilled engineers. Further, as the prestige of certain universities is important for academics and scientists, the reputation and international visibility of certain firms can be crucial determinants for foreign engineers to come to Germany. Especially global players like Mercedes or Bosch have, next to the financial resources, the corresponding high profile to attract engineers and technicians. Due to the export-led economy, the German government has recognized the necessity to provide certain pull factors for foreign engineers on a reform level. One such initiative aiming at attracting engineers to the European area is conducted by the EU, the so-called Blue Card Initiative. However, the experts are skeptical about the success because they don't think that it will substantially increase the number of migrants with an engineering background. However, it remains to be seen if this becomes true or not.

All in all, the hypothesis 4 can be confirmed because the private sector in Germany is able to provide higher salaries to engineers. Further, there are various internationally recognized firms that can attract foreign engineers due to their reputation. Finally, the German government is in an ongoing process of lowering the obstacles for foreign engineers to come to Germany, although there is still a lot that needs to be done.

Table 1. The effects of the factors derived from the theory of talent mobility for foreign academics and scientists (general) and engineers to come to Germany

	Academics and scientists (general)	Engineers
Immigration policies and policy regimes	+	++
International differences in earnings and development gaps	+	++
Agglomeration and concentration effects	++	++
Linguistic compatibility	+	+
Networks	++	++
Socio-cultural affinity	0	0

++ strong effect +moderate effect 0 no effect

To put it into a nutshell, it became clear that despite the cultural affinity all the different factors influence the migration of academics, scientists and engineers. However, some factors are more important than other, as you can see in Table 1. For example, it is important that the government removes barriers by establishing legal provisions that allow the migrants to reside in Germany. Moreover, the government must support certain programs like the Excellence Initiative, the Joint Initiative for Research and Innovation or by granting the

foundation of Welcoming centers. Nevertheless, much of the work can be done by non-governmental actors like universities, research institutions or by firms. These actors can set initiatives to attract more academics, scientists and engineers. This becomes obvious by considering networks, but also by looking at so-called “all-round carefree programs” offered by big firms that help foreign engineers to start their new life in Germany. Further, the German society as a whole needs to become active to break down their prejudice against migrants and to build up a society where migrants feel welcome. This can only be achieved if every single citizen welcomes migrants and supports tolerance.

8. Discussion

First of all, when I wrote my thesis, it became obvious that there have not been much research about this topic done yet. This might surprise in light of the fact that Germany is affected by a shortage of qualified labor force, especially in the sector of engineering. As an export-oriented nation, it depends on this qualified labor force in order to keep its economy running. Based on this, there is a strong need to increase scientific research about this topic to determine possible solution. However, to create appropriate conditions that allow a valid and reliable research outcome represents a central problem due to the lack of an organization in Germany that centrally collects data on standardized criteria about the numbers of foreign academics and scientists. This is also problematic with regard to my part referring to the quantitative data because the data set from “*Wissenschaft weltoffen*” does not provide a full overview of all academics, scientists and engineers from third countries that work in Germany. Thus, my data use data from only 40 scientific and research organizations that fund the exchange of foreign academics and/or finance research. This might be problematic in order to translate the data to the whole population of foreign academics and scientists in Germany. To improve the availability of data, the national Statistical Offices have to record the data that could be delivered to the Federal Office for Migration and Refugees. This could be achieved by legal implementations into the Hochschulstatistikgesetz.

Another treat appears due to the limited number of interviewed experts that might also threaten the generality of the results. However, due to the fact that the experts are from a wide range of organizations all strongly concerned with the international mobility and with long lasting experiences in this topic, I assume that the choice of these experts is well-grounded. Also the constraints on time and efforts provide an appropriate explanation for the number of experts chosen. In further research a higher number of interviewed experts would increase the generality. Moreover, it would be interesting to ask directly academics, scientists and engineers from third countries who work in Germany about their experience.

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