

**The international mobility of STEM<sup>1</sup> women in academia:  
Intersectional effects on their career progression**

Andrea Wolfram, Anna Bouffier, Carmen Leicht-Scholten

RWTH Aachen, Integration Team - Human Resources, Gender and Diversity Management, 52056  
Aachen, Germany

**Abstract**

In times of globalisation and skilled labour shortage the immigration of highly skilled is a topic of increasing political relevance. Despite great political efforts to win foreign professionals especially in science and technology, the potential of highly skilled migrants already living in Germany is neglected. This finds expression in a range of conditions that hinder foreign professionals in Germany in their career progression and leads to a huge 'brain waste' for the German society. First of all an overview of the extent of highly skilled migration and its conditions in Germany is given. After that findings of the research project "Highly skilled female migrants in technological cutting-edge research at universities", which focuses on female scientists in STEM subjects from former Soviet countries working at German universities, are presented. It is analysed which conditions and difficulties these women have to face and how this situation leads to a disadvantage in their career development by the intersection of the categories of gender and ethnicity.

**Introduction**

In the past years highly skilled migration has become a topic of increasing importance in Germany. In the context of the ongoing globalisation labour markets have expanded and overcome national borders. Especially the field of science and research has traditionally been a sector with a high mobility of international scientists which has continuously increased in the last decade. Parallel to this development there is a predicted skilled labour shortage in many European countries, which forces the need for more mobility of highly skilled. In the light of this situation the EU-Commission as well as single nation states have laid emphasis on measures applying to the solving of this problem. For instance many universities in Germany have reacted with specific recruitment programmes for highly skilled personnel. In this context they focus also on women, since the leaky pipeline effect in science and technology causes an underrepresentation of only 20% women scientists in STEM subjects at German universities in total (cf. HIS & DAAD 2009).

With special regard to the situation in Germany like in many other European countries there is a large number of highly skilled scientists who came to Germany during the past years. Especially people from the former Soviet countries constitute a large amount within the group of immigrants

---

<sup>1</sup> The term 'STEM' is an abbreviation and denominates the academic subjects of sciences, technology, engineering and mathematics.

living in Germany. Another relevant aspect which contributed to the rise of mobility in this special case is the political and socio-economic development of the former soviet states of Eastern Europe since the end of the Cold War in 1989. During their transformation process a large number of people decided to leave their countries of origin to start a new life in other countries like Germany. Many among them were women, a fact which provides an indication of the theory of the feminisation of migration (cf. Morrison et al. 2008). Despite the fact that research often focuses on the low-pay sector when theorising labour and migration, there is an unheeded group of highly skilled professionals who migrated to Germany in the past years. Among them there are many people with a qualification in STEM subjects. And since the demand for professionals in STEM is at an extra high level, the potential of highly skilled migrants gains centre stage more and more. Among these migrants the amount of women is much higher than are common rates of female professionals in science and technology in Germany, where these subjects are much more gender segregated than it is the case in many former Soviet countries.

These developments supply the background of the research project “Highly skilled female migrants in technological cutting-edge research at universities”<sup>2</sup>. Regarding current research it must be assessed that there is a lack in theorising highly skilled migration in connection with gender issues, especially in academia. Initial works in this field were submitted by Bauschke-Urban (2010), Heß and Sauer (2007), Englmann and Müller (2007) and Nohl et al. (2010a), but without focusing on women in STEM in particular. The situation of female migrant scientists in STEM subjects living and working in Germany is characterised by the specific influence of different categories for social disparity and differentiation. It offers the possibility to analyse the intersection of gender, ethnicity and cultural background and to gain knowledge of mechanisms of downgrading and exclusion from university careers. The main objective of the project is to figure out basic conditions which determine the continuity and success in the career progressions of migrant women in academia and causes for carrier setbacks respectively.

The analysed target group is composed of highly skilled migrant women in STEM subjects. They migrated from Eastern Europe and now work at German universities. We define “highly skilled” as persons with university degrees and PhD. We focus on women from Eastern Europe because in these countries science and technology are not as much gender-segregated as it is in Germany.

---

<sup>2</sup> The project is situated at the scientific unit “Integration Team – Human Resources, Gender and Diversity Management” (IGaD) at RWTH Aachen University in Germany. The project is funded by the German Federal Ministry of Education and Research and has a duration of two years between 2009 and 2011. It is part of the joint project “The integration of highly qualified migrant women into the German labour market. Effects of migration on highly qualified women’s professional careers in science and technology” in cooperation with the universities of Berlin, Hamburg and Aachen. For more information visit [www.hochqualifizierte-migrantinnen.de](http://www.hochqualifizierte-migrantinnen.de).

The authors want to thank Miriam Lämmerhirt who worked as research associate in the first year of its duration until her maternity leave when Anna Bouffier substituted for her in December 2009. The main part of the analysis of the statistical data is due to her.

To open the scope of the topic in terms of content three interviews with experts in the field of migration were conducted in the first phase of the methodical design. To complement the statements of the experts with the subjective perspective of affected migrant women and their experiences the second phase of the study design contained ten biographical interviews with highly skilled female scientists themselves as well as five biographical interviews with autochthonous women with similar profiles as the reference group.

In the following the initial results of the project “Highly skilled female migrants in technological cutting-edge research at universities” are presented. At the beginning the greater context of the situation of migration in Germany in general and highly skilled migration in particular are discussed. The legal framework as well as quantitative data concerning highly skilled migration is elaborated. After that the results of the three expert interviews conducted in the end of 2009 are presented. In general they focus on barriers which highly skilled female migrants have to face due to their occupational integration. Finally we will draw a conclusion.

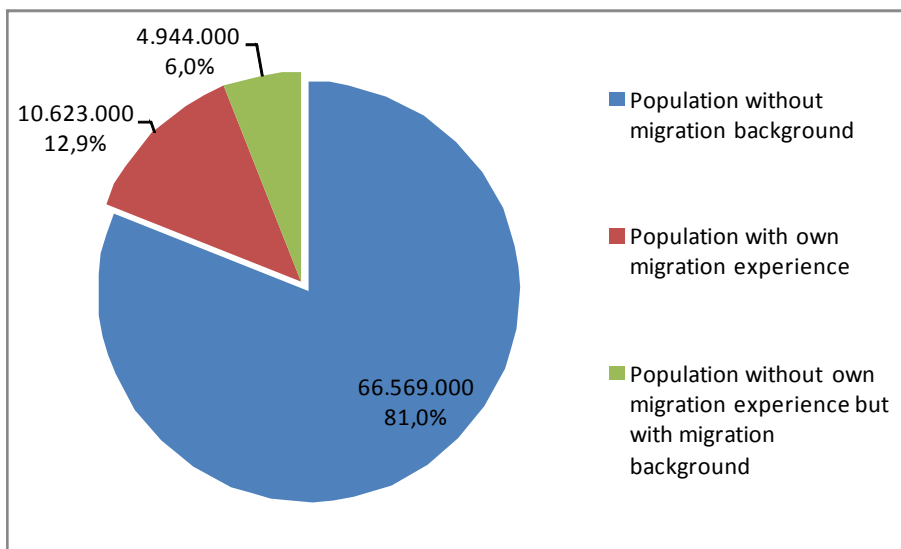
### **Highly skilled migration in Germany**

In the past years highly skilled migration has become a topic of increasing importance as already mentioned in the introduction. But this is a relatively new phenomenon in the history of German immigration and integration policy. Germany's immigration policy had rather been an instrument of defence and control than of strategic and demand-orientated regulation until the end of the 20<sup>th</sup> century (cf. Meinhardt 2005). Just since the turn of the millennium a new direction is indicated and the country seems to conceive itself more and more as an immigration country. Experiencing a transition into a knowledge-based society with a rising demand for qualified work and a critical demographic development, Germany has become aware of the new conditions and challenges it has to face at times and in the future. This development led to an easing of the relatively restricted immigration policy in order to open the German labour market for foreign professionals. But the result was not a systematic and coherent revision of the legal framework, but rather a series of singular legal amendments which did not always match with each other or third legal regulations (cf. Nohl et al. 2010b).

Especially the reform of the immigration law of the year 2005 was a reaction on the increasing demand for highly skilled in particular in the sector of science and technology. It regulated the central dimensions of 1) the immigration of foreign professionals, 2) the admission of refugees, and 3) the integration of new immigrants. In 2008 a second revision of the immigration law should simplify the access of foreign highly skilled to the labour market another time. The regulation of immigration should be orientated by the demands of the labour market. With the revision of the law it was pursued to advance the immigration of professionals and to facilitate access to the labour market of highly skilled workers like the interviewed women in the context of the project. But in

spite of these reforms a number of severe legal restrictions remained for the addressed group of professionals, especially for non-EU citizens.

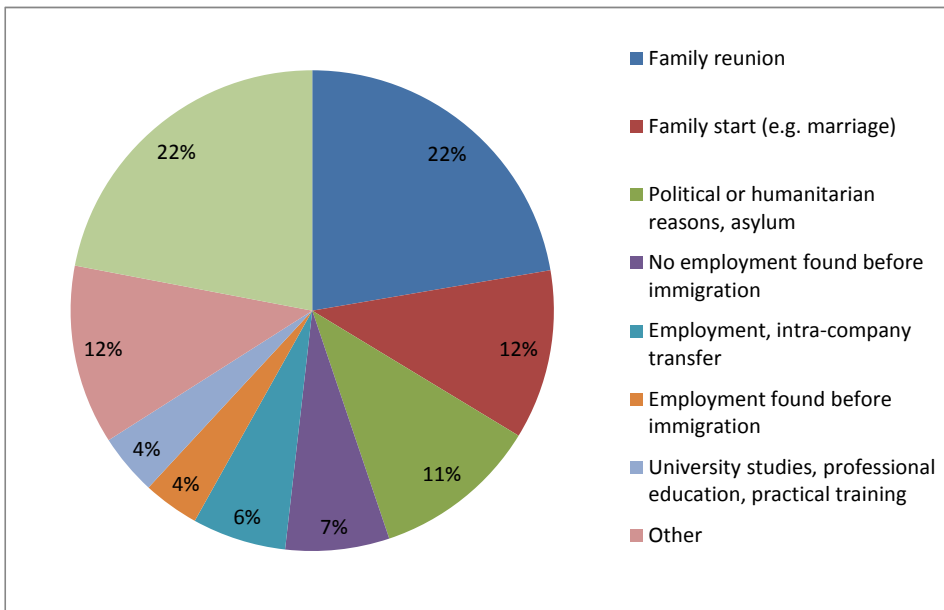
With regard to the quantitative situation of migration in Germany it can be stated that a percentage of nearly 19% (15,566,000 in total) of its inhabitants have a migration background, around 13% of the total population are people with own migration experiences and 6% have no own migration experiences but a migration background, because as the descendants of people who immigrated they belong to the second generation of migrants in Germany (cf. Figure 1).



**Figure 1: Population of Germany, with and without migration background (Statistisches Bundesamt 2010: 32)**

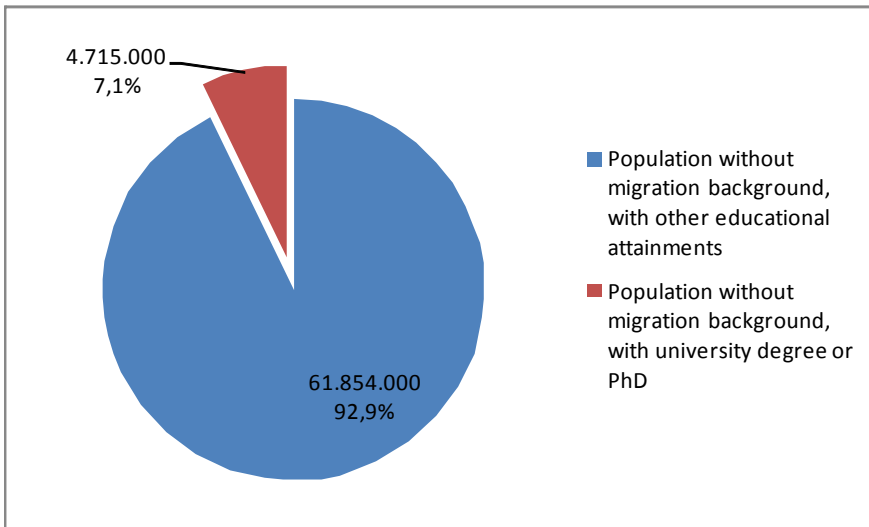
Since the 1990s the group of migrants from former Soviet countries has raised because of the fall of the “Iron Curtain”. Today 31% of the people without a German citizenship have a nationality from a former Soviet state, 25.4% are Turkish citizens and 24.4% have nationalities from EU-12 countries (cf. Bundesministerium des Inneren 2008: 178). In 2008 23% of the migrants came from Eastern European countries, 1.6 million in total (Eurostat 2009). Nearly 60% of them were women – that equates to 1 million women with Eastern European nationalities.

Since the number of foreign workers – the so called “Gastarbeiter” – decreased after the recruitment ban in the 1970s and the end of the Cold War the motives of migration to Germany have shifted from labour migration to family migration. As it is shown in Figure 2 today migration in the context of family reunification, marriage or other forms of family starting make more than a third (about 34%) in the list of migration motives, followed by refugees and asylum seekers. Concerning labour it is obvious that only about 10% of the migrants with own migration experience came to Germany with either an employment contract found before immigration or an existing employment contract for a intra-company transfer. Also migration in the context of education makes only 4% of the migration motives in 2008 (cf. Statistisches Bundesamt 2010: 56).

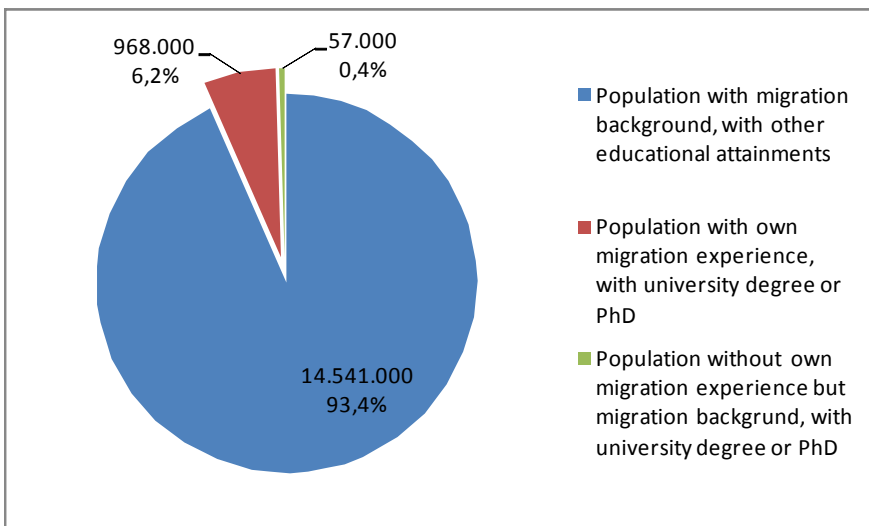


**Figure 2: Main motives of immigrants of Germany with own migration experiences, 2008 (Statistisches Bundesamt 2010: 56)**

Concerning education people with a migration background make about 18% of the total amount of German inhabitants with a university degree or PhD. As illustrated in Figure 3 university graduates make 7.1% of the population without migration background. In comparison to this proportion the amount of university graduates on the population with migration background is nearly equal. 6.6% of the total group of inhabitants with migration background have a university degree or PhD, in particular people with own migration experience have comparatively high amounts of university graduates (Figure 4).



**Figure 3: Population *without* migration background, amount with university degree or PhD (Statistisches Bundesamt 2010: 44)**



**Figure 4: Population *with* migration background, amount with university degree or PhD (Statistisches Bundesamt 2010: 44)**

Especially migrants from former Soviet countries have been very well educated in their countries of origin and therefore this group has great amounts of highly skilled. Many of them are professionals in STEM subjects where the demand for skilled workers is on a particularly high level. In contrast to the situation in Germany there are high rates of women among these professionals, because STEM subjects have not been as much gender segregated in post-socialist societies as in Germany (cf. European Commission 2009).

So it might be anticipated that there is a large number of female migrants working in STEM subjects in Germany. But the opposite is the case. Instead of the consideration of the existing potential of German-based migrants, who could accommodate the demand for professionals at

least to a certain rate, political attempts to face the predicted skilled labour shortage concentrate on the recruitment and immigration of foreign professionals from other countries exclusively (cf. Meinhardt 2005; Nohl et al. 2010c). Regarding the occupational integration it becomes obvious that highly skilled migrants already living in Germany are clearly disadvantaged (cf. Meinhardt 2008). While only 2.8% of German women with university degree are unemployed, among female migrants with foreign university degrees 14.6% are unemployed (Nohl & Weiß 2009: 13). These data is confirmed by a study of 2007 which states that only about 6.500 women from post-socialist countries with a profession in science and technology are employed subjected to social insurance contributions adequately to their qualifications (Heß & Sauer 2007). These insights are a clear hint for the phenomenon of an immense 'brain waste' in Germany. Also referring to the academic sector statistics proof that female migrants are underrepresented in this field of work as well. In the whole country only 842 female scientists with foreign nationalities are working in STEM subjects at German universities, even though science is a field of labour in which a high mobility is very common (cf. HIS & DAAD 2009). Therefore it is provided with a range of extraordinary regulations that make it easier for foreign scientists to integrate into this labour market and it is even harder to integrate for members of other groups of migrants. But despite these facts even in science there are a lot of conditions that hinder people from foreign countries in their career progression. In particular the situation of female migrant scientists gaining access to the German academic labour market is characterised by a specific constellation of features which determine difficult exit criteria as illustrated in the following paragraph.

### **Barriers for occupational integration in German academia**

In order to understand the reasons for this situation three experts of different fields of work were asked for their opinions. The first expert is a social scientist with a focus on highly skilled migration and with own migration experience, the second works for an organisation supporting migrants in their occupational integration and the third source consisting of two experts work both for an international office of a German technical university. They all corresponded with each other on the report of a variety of barriers and difficulties female migrants are confronted with during their career development. In the following we will go into details about the particular aspects in the sequence of their relevance during the process of occupational integration.

First of all there is a distinction between requirements a person has to meet during his or her application for a concrete employment and such requirements that are more fundamental because they provide access to the procedure of application in general. While the first ones concern the professional competence and are theoretically open for everyone qualified, the second are basic requirements that enable persons to get access to the application procedure in principle.

To the last ones belong to formal conditions like the *legal status* a person has including a residence and an employment permit which is one of the most fundamental conditions. It is linked

with official procedures and legal requirements that regulate immigration and integration of migrants. Probably the main barrier for foreign professionals is the insufficient *immigration and integration policy* of the German government. There are a range of bureaucratic obstacles which result from the complex and non coherent system of singular legal regulations which do not always match with each other and contradict to official policy guidelines.

Another aspect in this context is the deficient *acceptance procedure* by official institutions. Very often foreign university degrees and professions are not accepted in their entirety. Consequently this leads to the necessity of postgraduate studies or other measures of further education that cost time and money and represents a competitive disadvantage for the migrants compared to autochthonous people. This is unfavourable for women in particular who have already less time to establish themselves occupationally, because they have to reconcile their career development with the start of a family. An example for the extreme extent of *dequalification* is the case of unemployment, where migrants with a foreign university degree are automatically classified as “unskilled” by the German Federal Employment Office. Very often they do not receive adequate support by the employees of official institutions, who neglect to offer information, opportunities or measures to get one’s profession accepted. Instead of that migrants are often placed into jobs in the low-pay-sector and again especially women are affected by that (cf. also Nohl & Weiß 2009).

A further exit criterion for a successful allocation is *the knowledge of the language* as a key qualification. It is determining every relevant aspect requiring communication, which is affecting nearly everything despite the scientific excellence. But even professional excellence will not promote a career without the ability to communicate about it, what demonstrates the very basic character of the necessity of language skills.

More practical but also relevant to participate in an application process is the knowledge of *national standards* of the application system. There are many aspects that refer to certain knowledge of standards and conventions that are structuring chances for a successful allocation. Further on there are also required qualifications which vary in the geographical distribution and refer to the use of certain computer programmes, machines or technical norms. Another aspect refers to social competences and sensitivity towards different cultural and social norms which are important to get into contact with appropriate networks and to make a good performance in the interaction with colleagues and superiors. These are examples for qualifications migrants have to be conscious about and be able to catch up on to remain competitive with autochthonous applicants.

This fact leads to another problem which is the absence of adequate *career advancement* measures for migrants in general as well as for migrant scientist and females in particular which can support this group of people to acquire those requirements. In practice scientists who come with the support of special foundations like Erasmus have much better chances to get an adequate job at universities. Unfortunately there are not many of such institutions and also universities do not support international scientists sufficiently yet.



The next problem many migrants have to face during their occupational allocation is the insufficient integration into local scientific *networks*. Even though this is a disadvantage not only for migrants but also for autochthonous female scientists it is much harder for them to get into these networks because they have less time to make contacts. It requires the afore-mentioned social competences and experiences concerning norms of interaction, language and communication skills which are not easy to learn for non-native speakers. This aspect is a further illustration for the gendered nature of migration analysed in the presented project. Scientific networks in STEM subjects are *gender segregated* to a great extent because science and technology are male dominated in Germany since a long time. It is also hard for autochthonous female scientists to integrate themselves into these networks and thus it is harder for migrant women who have to face, as afore-mentioned, additional challenges.

The last aspect represents difficulties that occur not only in the beginning of the process of allocation, but become relevant after finding an employment. It concerns lacking measures of *reconciliation of family and work* – an extremely gendered theme, because despite of a slowly proceeding cultural value change it is still most common that women have the responsibility for childcare – also in post-socialist societies. But in most of the cases in these countries there was a sufficient infrastructure that enabled women to reconcile the pursuit of their career progression on the one hand and childcare and family work on the other hand. Female migrants with such a cultural background are used to both being employed as well as having children. The situation in Germany is very different from that. Especially in the conservative field of science and technology men who do not need to manage the reconciliation of family and work and are fully able to concentrate on their career progression are the norm. For females who find themselves in less comfortable situations this represents a clear competitive disadvantage.

Of course reconciliation is a problem not only for female migrants but for working women in general; however it is still one of the main barriers in the career progression of female migrants in STEM subjects in German academia. Referring to this gendered disadvantage they face equal problems as their autochthonous colleagues.

The results of these findings led to the assumption that female scientists in science and technology with migration experiences have to face multiple discrimination on the grounds of two categories of social differentiation, – gender on the one hand and their status as migrants on the other hand.

## **Conclusion**

We figured out that the insufficient occupational integration of female migrants in science and technology at German universities is a broadly neglected topic. The great potential of highly skilled migrant women already living in Germany is wasted although the country is facing skilled labour shortage. This finds its expression in the gap between expensive recruitment programmes by

universities on the one hand and the 'brain waste' of German-based highly skilled female migrants on the other hand. Not only economy and society but also affected migrant women suffer in the light of this deficient situation in Germany. The reasons for this situation are complex and are based on a lack of awareness and insufficient policies to remedy structural deficits and improve the integration of this group into the labour market. Only few of the German-based highly skilled female migrants can handle these barriers.

Main factors we were able to identify represent consequences of a deficient and non-coherent immigration and integration policy, dequalification resulting from the incomplete acceptance of professions, lacking language skills, or knowledge about national standards concerning application procedures. Further aspects refer on conventions of social interaction, missing measures of career advancement for migrants and women in particular as well as an insufficient infrastructure to reconcile family and work life.

Evaluating these factors composing the conditions determining a successful occupational integration, it became obvious that highly skilled female migrants are clearly disadvantaged because of their cultural background. During the process of career development ethnicity is regulating and structuring access to the labour market and thus has to be regarded as category of differentiation. Furthermore the sector of science and technology in Germany is gender segregated to a great extent what means a disadvantage in the positioning of this group as well. It underlines that migration is gendered in this view to a similar high extent. Highly skilled female scientists in STEM subjects are confronted with a particular situation characterised by the intersection of the categories of ethnicity and gender.

Considered in detail, the intersection of both categories is realised differently depending in the phase of the integration progress. During the first steps towards an occupational integration ethnicity plays a major role. After arriving in adequate jobs the influence shifts to a bigger dominance of the category of gender and highly skilled migrant women have to deal with similar problems autochthonous women have to face.

In further proceedings of the research project "Highly skilled female migrants in technological cutting-edge research at universities" we will substantiate this assumption and explain how the categories of gender and ethnicity interact with each other.

## References

Bauschke-Urban, Carola (2010), *Im Transit: Transnationalisierungsprozesse in der Wissenschaft*, Wiesbaden: VS Verlag für Sozialwissenschaften.

Bundesministerium des Inneren, Deutschland (Ed.), (2008), *Migrationsbericht des Bundesamtes für Migration und Flüchtlinge im Auftrag der Bundesregierung. Migrationsbericht 2007*, Berlin: Bundesministerium des Inneren.

Deutscher Akademischer Austauschdienst (DAAD) and Hochschul-Informations-System GmbH (HIS) (Eds.) (2009), Online-platform <http://www.wissenschaft-weltoffen.de/> [14 June 2010]. In September 2009 Anna Bouffier started an information request towards the data base of [wissenschaft-weltoffen.de](http://www.wissenschaft-weltoffen.de). Thus [wissenschaft-weltoffen.de](http://www.wissenschaft-weltoffen.de) provided diverse statistical data concerning the scientific personnel with foreign nationalities working at German universities and universities of applied sciences.

Englmann, Bettina and Martina Müller (2007), *Brain Waste. Die Anerkennung von ausländischen Qualifikationen in Deutschland*, Augsburg: Tür-an-Tür-Integrationsprojekte gGmbH.

European Commission (2009), *She Figures 2009. Statistics and Indicators on Gender Equality in Science*, Luxembourg: Publications Office of the European Union.

Eurostat (2009), Diverse data referring to characteristics of the German population of the year 2008, provided on request in 2009.

Heß, Barbara and Lenore Sauer (2007), *Migration von hoch Qualifizierten und hochrangig Beschäftigten aus Drittstaaten nach Deutschland*, Working Paper 9 der Forschungsgruppe des Bundesamtes, Nürnberg: Bundesamt für Migration und Flüchtlinge.

Meinhardt, Rolf (2005), Die ökonomische und soziale Situation hochqualifizierter Einwanderer in Deutschland – zum aktuellen Forschungsstand, in Meinhardt, Rolf (Ed.), *'Hochschule und hochqualifizierte MigrantInnen – bildungspolitische Konzepte zur Integration in den Arbeitsmarkt'*, Oldenburg: BIS-Verlag der Carl von Ossietzky Universität Oldenburg, 23-38.

Meinhardt, Rolf (2008), 'Die ignorierte Elite – zur prekären Lage hochqualifizierter Einwanderer und der Entwicklung von Studienangeboten zu ihrer beruflichen Integration', in Lange, Dirk (Ed.), *Migration und Bürgerbewusstsein. Perspektiven Politischer Bildung in Europa*, Wiesbaden: VS Verlag für Sozialwissenschaften, 217-228.

Morrison, Andrew R., Maurice Schiff and Mirja Sjöblom (2008), *The International Migration of Women*, Washington: The World Bank.

Nohl, Arnd-Michael and Anja Weiß (2009), 'Jenseits der Greencard: Ungesteuerte Migration Hochqualifizierter', *Aus Politik und Zeitgeschichte* 44: 12-18.

Nohl, Arnd-Michael, Karin Schittenhelm, Oliver Schmidtke and Anja Weiß (Ed.) (2010a), *Kulturelles Kapital in der Migration. Hochqualifizierte Einwanderer und Einwanderinnen auf dem Arbeitsmarkt*, Wiesbaden: VS Verlag für Sozialwissenschaften.

Nohl, Arnd-Michael, Karin Schittenhelm, Oliver Schmidtke and Anja Weiß, (2010a), 'Zur Einführung: Migration, kulturelles Kapital und Statuspassagen in den Arbeitsmarkt', in Nohl, Arnd-Michael, Karin Schittenhelm, Oliver Schmidtke and Anja Weiß (Eds.), *Kulturelles Kapital in der Migration. Hochqualifizierte Einwanderer und Einwanderinnen auf dem Arbeitsmarkt*, Wiesbaden: VS Verlag für Sozialwissenschaften, 9-35.

Nohl, Arnd-Michael, Ulrike Selma Ofner and Sarah Thomsen (2010b), 'Hochqualifizierte BildungsausländerInnen in Deutschland: Arbeitsmarkterfahrungen unter den Bedingungen formaler Gleichberechtigung', in Nohl, Arnd-Michael, Karin Schittenhelm, Oliver Schmidtke and Anja Weiß (Eds.), *Kulturelles Kapital in der Migration. Hochqualifizierte Einwanderer und Einwanderinnen auf dem Arbeitsmarkt*, Wiesbaden: VS Verlag für Sozialwissenschaften, 67-82.

Statistisches Bundesamt, Deutschland (2010) (Ed.), *Bevölkerung und Erwerbstätigkeit. Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2008*, Fachserie 1, Reihe 2.2, Wiesbaden: Statistisches Bundesamt.