

Christian Reiner

Which policy options for Europe in the global
competition for talent? Brain competition policy
as a new breed of locational policy with positive
externalities

SRE-Discussion 2010/01

2010

**Which policy options for Europe in the global competition
for talent? Brain competition policy as a new breed of
locational policy with positive externalities**

Christian Reiner

Department of Geography and Geology
Research Group Economic Geography
University of Salzburg
Hellbrunnerstraße 34, 5020 Salzburg, Austria

E-mail: christian.reiner@sbg.ac.at

January 2010

Abstract

The emerging knowledge economy has led to an increase of demand and locational competition for highly-skilled labor. Brain competition policy (BCP) is the reaction from national and regional policymakers. In short, BCP refers to the attraction, education and circulation of talent in and between regional and national economies. This new focus on human capital instead of physical capital indicates a paradigmatic shift in innovation policy and regional policy. While most of the contributions to this new policy approach come from the US, it can be demonstrated that different institutions in Europe prevent the simple copying of those strategies. The article contributes to the ongoing paradigmatic shift by conceptualizing a coherent framework for BCP from a European perspective.

JEL classification: R58, O32

Key words: Brain competition policy, human capital, innovation, Europe

1 Introduction

Highly-skilled individuals are one of the key factors for innovation and knowledge-driven economic development (Lucas 1988, Florida 2002). They have become more and more mobile in the last decades, thereby functioning as “knowledge spillover agents” (Bergman and Schubert 2005). They transfer valuable knowledge from one region to another and contribute to the upgrading of regional knowledge pools by means of their mobility, triggering positive static and dynamic externalities (Saxenian 2006, Döring and Schnellenbach 2006). As a consequence, there is hardly any current sectoral or territorial innovation strategy without some recommendations to increase the attraction of talent (ILO 2006, OECD 2009). Concomitantly, a new body of regional and innovation policy research is emerging that proposes a new paradigm centered on human capital as the main driver of knowledge economies (Florida 2002, Markusen 2008, van Dijk et al 2009).

Alas, compared to the US and Canada or Australia, Europe seems to have a rather weak position in the competition for global talent (Table 1). A brain drain of the best and brightest European talent to the US, a lack of competitiveness in the attraction of foreign talent and an undersupply of native graduates in science and technology are indicators of the unfavorable match between demand and supply of highly-skilled workers in the EU economies (Tridat 2008, Goldstein and Cervantes 2008). Due to comparatively high percentages of tertiary educated people living abroad, European states have a quantitative large diaspora. Ageing and a fall back in productivity growth compared to the US further aggravate the prospective performance of Europe (Sapir 2007). Europe risks constraining future economic growth and the relocation of knowledge intensive businesses if the latter cannot hire human capital according to their needs (Reinstaller and Unterlass 2008). As a response, the Presidency Conclusions of the Lisbon Summit (2000) claim “to ensure that Europe offers attractive prospects to its best brains [...] and to attract and retain high-quality research talent in Europe.”

Table 1: Brain drain or brain gain? Canada and the US in comparison with the “big four” EU economies

	Share of foreign population with tertiary education ¹	Percentage of people with tertiary education, living abroad ²	Migration balances for star scientists ³
<i>Canada</i>	38.0	4.9	0.0
<i>United States</i>	26.1	0.5	+23.4
<i>United Kingdom</i>	34.8	16.7	-3.6
<i>France</i>	18.1	3.9	+0.5
<i>Germany</i>	14.9	8.8	-1.7
<i>Italy</i>	12.2	7.0	-1.6

¹Data: OECD 2008; ²Data: World Bank 2008; ³Star scientists are defined according to the ISI HighlyCited.com database, Data: Maier et al 2007

Concomitantly and as a result of the new policy orientation under the Lisbon strategy, the EU and several member states started to launch several policy programs with the aim to curtail European brain drain and to pull foreign talent to Europe (for overviews see e.g. Mahroum 2005, Boeri and Brücker 2005, ILO 2006, OECD 2008). As a result of the complex bundle of factors that drive the mobility of highly-skilled workers, policy actions encompass a wide array of policy fields ranging from taxation issues to university reforms; anyway, the political debate rather concentrates on migration legislation. They are implemented at different spatial scales following the multilevel governance scheme of the EU and the specific degree of devolution in different member states. Contrary to the US or Canada, which launched their first legislation in favor of highly-skilled immigration as early as in 1952 and 1967 respectively, European states and the EU started to set policy actions in favor of the highly skilled only recently (see below). These measures can be interpreted as a delayed policy spillover from the US or other immigration economies such as Canada or Australia to Europe and a catching-up process of the EU in the competition for talent. Hence, some of these measures show a striking similarity with US institutions and regulations. For instance, the US Green-Card was imitated inter alia by an EU-proposed so-called “Blue-Card” and a German “Green Card”. The US talent magnet, the Massachusetts Institute of Technology (MIT) was copied e.g. by the EU with the set up of the European Institute of Innovation and Technology (EIT) and the Institute of Science and Technology Austria (IST). Eventually, the European Commission initiated the creation of a common labor market for researchers (European Research Area) and a harmonized entry scheme for non-European researchers (scientific visa) to be competitive with the US in terms of critical masses and labor market size (EC 2000). Besides some similarities between the policy actions taken in the EU, there are also remarkable differences depending on the country-specific context. Three examples from quite different states demonstrate the wide range of preferred policy options.

Spain: Like other Mediterranean countries such as Italy or Greece, the university system of Spain is characterized by several unfavorable conditions for young researchers (Morano-Foadi 2005). Following Hellmans (2001) and Cruz-Castro and Sanz-Menéndez (2005), the most pressing problems in Spain are the following: An undersupply and brain drain of researchers in several scientific disciplines; temporary and precarious jobs with low salary positions; career progress depends on a patronage system rather than on individual research performance. As a response to this situation, the Spanish government launched the “Ramón y Cajal”-program in 2001 which targets at researchers with a PhD (Cruz-Castro and Sanz-Menéndez 2005). This program should, inter alia, facilitate the return of Spanish researchers working abroad and attract foreign researchers to Spain. The offer available to successful applicants consists of newly established tenure track-like research positions, a salary similar to that of a university professor and the possibility to run their own research projects. An evaluation in 2005 found out that the two goals of the program mentioned above were achieved rather well. By this time, around 2000 tenure-track positions were allocated to home-based or expatriate Spanish and foreign PhDs (Cruz-Castro and Sanz-Menéndez 2005).

United Kingdom: It was only in the second half of the 1990s that UK governments adopted a positive attitude towards recruiting global talent (Findlay 2006). A recently published policy document states the aim bluntly: “...boosting the UK’s economy by attracting and retaining the ‘brightest and best’ as workers or businesspeople” (Home Office 2006, p. 4). The main reform undertaken to lure foreign talent to the UK was the implementation of a point-based system emulating Canadian and Australian examples. This implementation reduced the administrative barriers to enter the UK impressively: While around the year 2000 80 different entry routes were available, in 2009 the number has been reduced to 5. Yet, highly-skilled immigrants were the first group of immigrants that was favored by a point-based system already since 2002. Taken together, the result of this policy change has been a shift of the UK’s position in the competition for talent from brain exchange, i.e. inflows more or less equal outflows, to a remarkable brain gain. Additionally and contrary to e.g. Germany or Austria, the UK opened the borders for workers from the new EU member states in Eastern Europe right after their date of accession without any transition period or restrictions. From the perspective of network-migration, this might be a first-mover advantage in the competition for Eastern European talent compared to latecomers such as Germany (Straubhaar 2000, Weizsäcker 2006).

Germany: Until the early 1970s, labor-market-oriented immigration to Germany was characterized by actively attracted low-skilled workers, the so-called “Gastarbeiter”. After the recession of the 1970s had set in, active recruitment of foreign workers was abolished (Zimmermann 1995). First exemptions for specific skills were granted as early as 1990 (Heß 2009). Following the boom of the ICT industry, sector-specific labor market shortages in Germany led to lobbying activities from business organizations and consequently to the announcement of a so-called “Green Card” to attract foreign, i.e. non-EU IT professionals

(Kolb 2005). Despite the similarity of the label to the famous US model, the German version, which was available between 2000 and 2005, was not competitive with the US counterpart because it merely offered a temporary working permit for a specific sector of the economy. The number of applicants under this entry scheme remained below expectations. Especially large IT firms such as Siemens or IBM hired hardly any ICT professionals under the Green Card scheme since they had already well-established globally-oriented internal labor markets which make them rather independent of specific policy actions. Yet, the Green Card and the surrounding political discourses served as a vehicle for a reform of the restrictive German immigration regime into a system with explicit selection mechanisms in favor of highly-skilled individuals (Hoffmann 2009).

Despite this wide range of already implemented policy schemes, there is no systemic and comprehensive policy framework that might inform and support European policy agents in the competition for talent. Following a new stream of empirical research, the argument is that the already existing policy approaches from the US are not easily applicable to the European context (Asheim 2009, Boschma and Fritsch 2009, Hansen and Niedomysl 2009). Hence, the paper proposes a framework that acknowledges the distinctive structures and institutions of the European context in the competition for talent. The proposed concept is denoted as “brain competition policy” (BCP). BCP is defined as attraction, retention, education, circulation and utilization of talent functioning as knowledge spillover agents in and between regional, national and supranational economies. Talent or highly skilled refers to four occupational groups of outstanding importance for the competitiveness of European regions: engineers and corporate researchers, students and academic researchers. The concept of BCP was formulated on the basis of encompassing case studies on related policy actions, instruments and actors on various spatial scales in a number of European countries with a special focus on Austria (Reiner 2009). Thus, the elaborated framework and typologies are analytical not empirical, even though they have been partly derived from empirical research.

The contributions of the BCP-framework to the related literature are as follows: First, a common terminology is established to capture the relevant aspects of highly skilled mobility in a systemic manner. Second, the framework conceptualizes the importance of the regional level and regional clusters in shaping global flows and stocks of knowledge spillover agents. Third, a European perspective is adopted which contextualizes BCP in order to account for institutional differences between the US and European states.

The paper is organized as follows: Section 2 surveys the literature that represents the proposed paradigmatic shift in regional policy towards human capital. The third section outlines a number of stylized facts that distinguish the European from the US context. Section 4 presents the main elements of the BCP framework. Complementarities of BCP actions are outlined in section 5. Four ideal types of strategies serving to attract foreign talent are discussed in section 6. The seventh section concludes.

2 New regional policies for Europe?

The following three contributions stand out from the existing literature focusing on the importance of human capital in regional policy: First, the “creative capital approach” (Florida 2002); second the “circulation approach” (Saxenian 2006) and, third, the “human capital approach” (Markusen 2008).

From business climate to people climate - As a result of his studies on the movement of the creative class in the US, Florida (2002, 2007) infers the need for a shift in regional policy. Talent functions as the primary driver of regional growth and the evolution of high-tech industry clusters. Accordingly, regions should aim to attract the highly-mobile talented workers. The crucial assertion is that talented people select places because their amenities and openness and not because of their economic performance. Moreover, it is claimed that jobs follow people and not vice versa (Florida 2007, Storper and Scott 2009).

While these policy recommendations have also been questioned for the context of the US economy, they could not be replicated for European countries (Peck 2005, Möller and Tubadji 2008, Storper and Scott 2009, Asheim 2009). Recent studies on the mobility behavior of the creative class in Sweden, Italy and Germany clearly showed that the main driving force is the spatial search for employment opportunities and not for cultural amenities (Coniglio and Prota 2006, Arntz 2006, Hansen and Niedomysl 2009).

From talent retention to talent circulation - This proposed change in mobility and regional policy results from the studies conducted by Saxenian (2006) on the circulation of especially Indian and Chinese highly-skilled workers and entrepreneurs between Silicon Valley and Shanghai or Bangalore. The formula of the proposed policy shift stems from Gertler’s review (2008) on Saxenian’s book entitled “The new Argonauts” (2006). The quintessence is that regions which suffer from an initial brain drain can subsequently gain from the presence of a highly-skilled diaspora (Fromhold-Eisebith 2002, Davenport 2004). The presence of “enduring social relationships” between former co-located inventors facilitates knowledge spillovers across spatial distance (Agrawal et al. 2009). Furthermore, the high relevance of agglomeration effects for channeling migration is underlined (Weizsäcker 2006, Solimano 2008, World Bank 2009).

Even though the examples of knowledge spillovers across spatial distance are impressive, the approach has some shortcomings. First of all, the circulation aspect implies the outflow of valuable knowledge to competitor regions. Naturally, this is not in the intuitive self-interest of regional policy agents; this approach therefore demands some counterintuitive policy action which could very easily fail to deliver beneficial circulation (Newland et al. 2008, Wahdwa 2009). Additionally, even enterprises facing increased “recruitment-based

competition” are afraid of knowledge leaking due to poaching knowledge spillover agents from the firm’s staff; labor contracts often contain incentives like pecuniary externalities to inhibit knowledge leaking due to brain circulation (Döring and Schnellbach 2006). Moreover, some danger lies in the uncritical adoption of this model as a vindication of the increased recruitment and attraction of highly-skilled workers from developing countries (Worldbank 2009, OECD 2009).

From a physical capital policy approach to a human capital policy approach - The results of physical capital policy in the form of incentive give-aways to lure external capital are somewhat ambiguous. Consequently, the need for more effective and efficient policy options emerges. Markusen alternatively proposes a refocussation of regional policy on human capital. “Bringing ‘stereo vision’ to regional economic development” (Markusen 2008, p. 48) is the aim of this new type of regional policy. The importance of regional internal human capital building is stressed; hence, the focus is on educating and training of the regional population. Nevertheless, it is also claimed that due to specialization and identity building in certain occupational fields, regions develop the ability to attract talented workers. Policy measures should aim at improving of regional education and training institutions, which have to be bound up with the demand side of the regional labor market. Compared to the approaches of Florida (2002) and Saxenian (2006), the policy proposals of Markusen do not rely on specific assumptions regarding the mobility behavior of highly-skilled individuals or the political and economic context. Furthermore, Markusen explicitly recognizes positive complementarities between the economic utilization and education of regional and extra-regional talented individuals (see sect. 5).

3 Contextualizing BCP: A European perspective

The three approaches discussed in the previous chapter were formulated on the bases empirical research in the US. However, applying these approaches to a non-US context reveals that there is no straightforward way of adopting them as best practice strategies for Europe (Hall and Soskice 2001, Asheim 2009). The relevant differences between Europe and the US are summarized in table 1. It should be stressed that there are also great differences between EU member states. For example, the UK shows more similarities with the US than with most EU countries. Nevertheless, joint EU policy actions (e.g. within the Lisbon Strategy) have to be based on assumptions about the European economy as a whole.

Underlying table 1 is the assumption that locational choice and mobility behavior of talent broadly depend on four factors: Mobility and migration issues, socioeconomic context, and regional sectoral structures and dynamics (Solimano 2008, Burkert et al 2007). Following Storper and Scott (2009, p. 161), the importance of sectoral demand factors can be

attributed to the simple logic of life that “most migrants – unless they enjoy a private income or are able to capitalize on some purely personal talent that can be practiced anywhere – are unlikely to be able to move in significant numbers from one location to another unless relevant employment opportunities are actually or potentially available.”

While the mobility of students and academic researchers is heavily influenced by the structure and performance of the university sector, locational choice of engineers and corporate researchers is affected by the structure and performance of the business sector. Due to the convergence of migration regulations via policy spillovers (race to the bottom for highly skilled workers and race to the top for low skilled workers), industrial structure and university performance gradually gain importance (Boeri and Brücker 2005, OECD 2009). This is, for example, the case for highly-skilled mobility of EU-citizens inside the Single Market. Territories can no longer compete on the bases of migration regulation; socioeconomic context and sectoral productivity differentials become the main drivers of talent mobility in Europe.

Table 2: BCP in the US and EU: Stylized facts and institutional differences

	US/ liberal market economy/ Anglo-Saxon model	EU/ coordinated market economy/ Rhine model
<i>Migration and mobility</i>	Small outflows of native talent; large inflow of foreign talent	Large outflows of native talent; small inflows of foreign talent
	Positive lock-in effect in the competition for talent because of a large stock of foreign highly-skilled workers (positive network-effects)	Negative lock-in effect in the competition for talent because of a large stock of low-skilled workers (negative network-effects)
	High labor market oriented mobility and flexible labor markets	Low labor-market-oriented mobility and dominance of long-term contracts
	Migration legislation in favour of high-skilled immigration since the 1950s	Policy towards a skill-biased migration regime changed only recently; traditional migration regimes supported the influx of low-skilled workers
	Federal state as the main actor in migration policy	Complex multi-level governance in migration issues
<i>Socioeconomic context and labor market</i>	Weak public sector; low level of public goods and social security	Strong public sector; high level of public goods and social security
	Individualized wage bargaining (Decompression of wage structure); low income taxes; relatively high wages for highly-skilled workers	Centralized wage bargaining (Compression of wage structure); high income taxes; relatively low wages for highly-skilled workers
	One common language: English as global lingua franca	Several, very different languages, seldom taught outside the country or the EU
	Large integrated labor market with common institutions	Fragmented labor market with powerful national borders for third-country nationals
<i>University sector</i>	Concentration of leading world class universities and star scientists	Dominance of mediocre universities
	Private universities offer more discretion in hiring academic scholars and selecting students	Public universities are more restricted in discretion and student selection
	Tenure track and excellence based competition	Insecure career prospects and network-based competition
	Strong university-industry linkages	Weak university-industry linkages
<i>Business sector</i>	High-tech and project oriented industries	Diversified quality production and long-term production arrangements
	Radical innovation, analytical knowledge base, general skills	Incremental innovation, synthetic knowledge base, firm specific skills
	Knowledge spillovers due to inter-company mobility of highly-skilled workers	Knowledge spillovers due to inter-company R&D collaborations
	Globally visible and large industrial clusters, big enterprises	Weak or rather unknown and small clusters, SMEs
	Low barriers for conducting and starting a business	High barriers for conducting and starting a business, lack of venture capital

Based on: Hall Soskice 2001, Gertler 2003, Dosi et al 2005, EC 2007, Asheim 2009

Consequently, the success of the US in attracting foreign talent rests only partially on migration laws like the green card or the H1B visas. One important explanation for the clustering of foreign engineers in Silicon Valley are the agglomeration advantages caused by the dynamic development of a globally visible high-tech cluster, an entrepreneurial and open climate and several other attributes of the real economy (Krugman 1991, Saxenian 2006, Wahadhwa 2009). Following Peri (2007, p. 44), the same holds true for the high concentration of star scientists in the US: “The very large inflow of scientific talent to the United States, which by all accounts has been a key to sustaining high rates of technological innovation, has largely been powered by the pull of America’s best research institutions – not by its immigration laws”. Taken together, migration laws that facilitate and support the inflow of foreign talent are important; however, they are only a necessary but not a sufficient condition for the attraction of human capital. Below, the main results from table 1 are discussed to elucidate their implications for European BCP.

3.1 Migration and labor markets

Europe has a double deficiency in the competition for talent: On the one side, there is a brain drain of European talent to the US; on the other side, a weakness in the attraction of non-European talent (Goldstein and Cervantes 2008, Tridat 2008). This pattern is strongly path-dependent: The US opened the borders by offering quotas for temporary or permanent residence for foreign highly-skilled workers already in the 1950s. European immigration, on the contrary, was characterized by large inflows of low-skilled workers from southern Europe in the 1960s; after the economic downturn in 1973 a “Fortress European migration policy” (Zimmermann 1995) was established and only recently relaxed for highly-skilled immigrants. The reform of migration regulations in the EU countries occurs at a very different pace and scope (for an overview see OECD 2008). However, most of these reforms are too young to draw clear conclusions on their effectiveness (OECD 2009). Taken together, three conclusions can be derived: First, the US has a head-start in the competition for talent, especially regarding talent from developing countries. Second, European migration reforms favor highly-skilled immigrants; however, these reforms are frequently not competitive with US regulation (Weizsäcker 2006, Kolb 2005). US residence and working permits are generally more generous than those from EU countries. Hence, regulatory competition provides a competitive advantage for the US. Third, there is no common immigration policy on the EU level that offers access to the entire EU labor market. As a result, the US migration laws offer a much more attractive good than the European laws: access to the bigger, integrated and institutionally homogenous US labor market.

3.2 The European social model in talent competition

Several scholars point to the need to increase European wage differentials and lower taxes in favour of the highly skilled (Straubhaar 2000, Sinn 2008). Otherwise, Europe will inevitably stay behind in the competition for talent because higher wages pull highly-skilled workers to the US labor market. However, such reforms may not fit with the preferences of European societies. According to a substantial body of research, the economic and social context of Europe, commonly denoted as the European social model (ESM), combines competitiveness and social justice along the lines of responsibility, regulation and redistribution (Giddens 2005). Eventually, this leads to a different position in the competition for talent. Can Europe be competitive given the lower wage levels and higher taxes? An interesting example in this respect is given by the discussion of brain-drain from Canada to the US at the beginning of the 21st century, because Canada's socioeconomic system resembles the ESM quite well. Instead of proposing free-market reforms following the US model, the discussion refocused on the competitive advantages of the own socioeconomic system. For example, Kesselman (2001, p.78) proposes policies to counter brain drain to the US without "Americanizing" Canada because "the danger is not only that we might fall short in attempts to make our labour markets and tax levels competitive with those of the US, but also that in the process we would sacrifice the positive features that distinguish Canada. Those distinctive cultural, institutional and civic traits are critical, albeit underrated, assets for Canada in competing with the US and other countries for the best workers." Following this line of reasoning, the emerging European social model should be interpreted as strength, promoted and marketed in the competition for talent (Aiginger and Guger 2006). A higher level of public goods such as education, social security, safe cities or a clean environment improves the quality of life and makes locations more attractive. According to several rankings, European countries and European and Canadian cities generally outperform the US significantly in terms of life quality (conf. e.g. the periodical rankings from "The Economist Intelligence Unit"). Nevertheless, an efficient provision of public goods is required to remain competitive with low-tax locations. Taken together, the concept of BCP presumes that the ESM provides a comparative advantage that can function as an attractive and differentiating location factor in the competition for talent.

3.3 University and business sector

The relatively poor performance of the European university sector is well-evidenced by several rankings and single indicators such as publications, patents or citations (Aghion et al. 2008 Bauwens et al. 2007). Due to significant "human capital externalities" (Lucas 1988) derived from being near leading academic researchers in global centres of excellence, and the preeminent concentration of highly-cited researchers, of Nobel-Prize winners and generally of world-class universities in the US, European academics and students have strong incentives to join their peers or prospective teachers in the US.

The European business sector is characterized by a number of properties that contribute to the relatively weak attractiveness of Europe in the competition for foreign talent. First of all, the European business sector has a lower share of high-tech industries (Dosi et al. 2005). This is reflected in the distribution of corporate researchers: EU enterprises employ 600.000 researchers, US enterprises more than 1 million (EC 2007). Accordingly, firms in the US provide more and multiple career opportunities for corporate researchers and engineers in high-tech branches. Additionally, even the low demand for highly-skilled employees is hard to fulfil because European low- and middle technology firms lose employees to the high-tech sector and are generally less attractive for employees (Reinstaller and Unterlass 2008). Second, European clusters are smaller and less visible. Europe's employment share in strong clusters (i.e. regional clusters in which a region is more than twice as specialized as the average region) is 25% lower than in the United States (EC 2008). High-tech clusters, however, are very important for attracting highly-skilled workers (Straubhaar 2000, Fromhold-Eisebith 2002, Porter 1998). On the one hand, a critical mass creates visibility and enhances the chances that this place will be chosen by migrants. On the other hand, clusters offer a dense and specialized labor market and hence all advantages arising from labor market pooling (Krugman 1991). In other words: "The competition for talent is not just between nations: The real battle is among cities and regions" (Florida 2007, p. 158). Third, European firms are smaller; SMEs are more important for Europe than for the US (EC 2007, Deutsche Bank Research 2009). SMEs are faced with size-specific barriers boosting transaction costs in hiring foreign talent. SMEs are not renowned and they cannot profit from the presence of internal labor markets that channel talent e.g. from Asia to Europe (Meißner and Bielefeld 2007). The relevance of this European structural disadvantage in the competition for talent is underlined by the empirical finding that the undersupply of highly-skilled people is the main obstacle for expansion of fast growing SMEs (Reinstaller and Unterlass 2008). The reliance of SMEs on policy actions in this respect became obvious under the German "green card" scheme. 75% of all non-EU ICT professionals who received a green card were hired by SMEs. It emerged that MNEs are not dependent on such schemes since they have already established their own institutional channels (Kolb 2005). Fourth, EU start-ups, especially young radical innovators, face much higher entry barriers than US start-ups (Veugelers 2009). One important factor in explaining the US success in retaining foreign students after graduation is that various graduates have start a business which almost naturally binds foreign talent to the region. Obviously, a highly supportive regulatory, financial (venture capital) and close university-industry linkages increase the likelihood of staying in the US even after university graduation. Again, Europe may lose valuable talent and potential entrepreneurs after graduating from European universities because of high barriers for high-tech start-ups, let alone the numerous problems associated with residence and working permits for non-EU graduates (Gächter 2007).

4 Conceptualization of BCP

Brain competition policy is about the attraction, retention, education, circulation and utilization of talent functioning as knowledge spillover agents in and between regional, national and supranational economies. BCP is based on the complexity of factors that shape the mobility and location decisions of highly-skilled workers. The theoretical basis is mainly made up of the following concepts: varieties of capitalism, knowledge base, knowledge spillover, learning, proximity, chain migration, human capital and clusters. It proposes a multi-level and multi-policy field approach as an appropriate policy model for the European context. Several cases revealed a lack of coherence between different policy actions and strategies (OECD 2006, OECD 2009). According to Angenendt and Parkes (2008, p. 1), labor migration policies in the EU “have been uncoordinated, self-contradictory and geared to short-term priorities.” Hence, the main building blocks of BCP are conceptualized around the notions of coordination and complementarity, stressing the relevance of coherence in this emerging policy field.

The relation of BCP to other policy fields can be explained by the main factors that influence stocks and flows of talent according to table 1. Usually, each of these factors (migration and mobility, socioeconomic context, university and business sector) is associated with specific policy fields (Fig 1). BCP is a cross-sectional matter which has to be addressed in different policy fields. Comparability with other emerging policy issues such as innovation policy, an increasing complexity of policy actions and strategies, cross-cutting several formerly rather isolated policy fields, can be observed (Lundvall and Borrás 2006, Laranja et al 2008). Subsequently, the main building blocks of BCP are presented and a common terminology is suggested to facilitate a common understanding, to induce coherence in a quite complex and fragmented policy field and to address the relevant issues systematically.

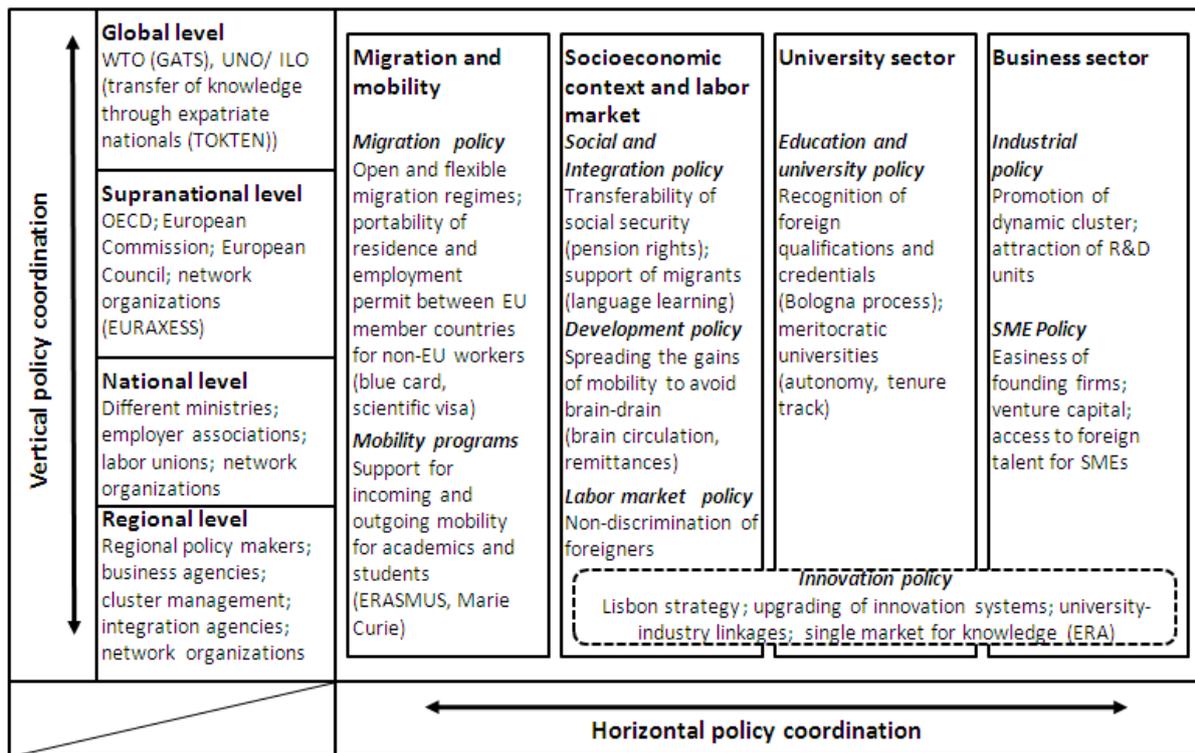


Figure 1: BCP as a multi-level and multi-policy field approach. Actors and policy actions

Mobility and location decisions of the highly skilled are shaped by policy actions implemented at various spatial scales. Moreover, a variety of policy fields organized quite differently in the EU member states are relevant in providing attractive conditions for highly-skilled workers. As a result of this multidimensional policy approach, a strong case is made for taking coordination issues seriously (Fig 1). Four coordination issues emerge as relevant preconditions for efficient and effective policy designs: Vertical, horizontal, interregional and lateral policy coordination.

4.1 Vertical policy coordination

Vertical policy coordination refers to the coordination of policy actions at different spatial levels. Pointing out a broad-brush picture of the European situation reveals substantial differences to the US. Several policy fields depicted in Figure 1 are subject to the specific European scheme of multi-level governance (Heywood 2007). Vertical coordination tasks depend on two factors: the policy field and the distribution of political power between the different geographical scales. The importance of the regional level in BCP is strongly influenced by processes of devolution or centralization. In the following, vertical coordination is discussed from a positive and a normative perspective. The discussion of normative issues will be restricted to migration policy.

Which policies are implemented at which spatial scale? Migration policy and the university and business sector related policies are quite different regarding the division of political competences at different spatial scales. Migration policy is traditionally one of the core competences of the national level. Regional policy makers have no or only minor competences. However, as the example of Canada demonstrates, this is not always the case: The “Provincial Nominee Program” enables regional policy makers to select immigrants according to specific regional needs. Regions can attract highly-skilled workers even if they are not allowed to enter the country according to the criteria of the national point-based system (Schmidtke 2009). There are no comparable examples of a regional migration policy in Europe. Instead, there is a - weak - tendency to shift political power from the national to the supranational level of the EU.

The role of the regional level in BCP is much more important in university and business sector-specific policy fields. Empirical research on residential choice of foreign highly-skilled workers in Germany showed a strong influence of labor-market conditions and university performance (Burkert et al. 2007). Cluster policies as part of a proactive industrial policy, for instance, are typically sub-national policy issues with a potentially decisive impact on regional labor market dynamics. Yet, Europe has relatively few globally visible clusters (EC 2008). National borders and excessive federalism in small states lead to the proliferation and duplication of small and fragmented clusters below the critical size necessary to become effective attractors for foreign talent. Hence, fostering coordination between regional clusters to achieve critical masses and stronger centripetal forces to pull talent to Europe is an important task for the EU countries and regions. Establishing external linkages (“global pipelines”) via the mobility of engineers and scientists, in turn, is an essential prerequisite for the enduring innovativeness of regional clusters (Bathelt et al. 2004, Saxenian 2006, Gertler 2008).

While cluster and innovation policies are frequently decentralized policy fields with some coordination at the EU level, university policy is rather different. Comparing a decentralized university system in Germany with a centralized system in Austria shows substantial differences in the possibilities of regional policy makers to set BCP policy actions via university policy. In Germany, universities are regulated by the federal states. For example, North Rhine-Westphalia, a federal state in Germany, established - inter alia - a program to lure German junior post-doc nanotechnology researchers who stayed abroad for at least 24 months back. The regional government offers the respective junior researchers tenure track positions and the possibility to build up new autonomous research groups. The funding amounts to a maximum of 1.25 mio Euros for five years per research group. To launch such a program would be challenging for Austrian regional policy makers. The competences for university policy are concentrated on the national level. For instance, Austrian regions finance - if any - just a few endowed professorships or visiting professorships to attract academics with region-specific research foci to the region. As a result, Austrian regions are only minor players in BCP-related university policy.

Which spatial level is best suited for European migration policy to attract foreign talent? This normative perspective on spatial level migration policy assignment can be analyzed by applying fiscal federalism theory (Oates 2005). Two arguments can be derived; both point to the advantages of a stronger centralization. First, in the case of star scientists, knowledge spillovers are not restricted to the region of residence. Especially small states like Austria or Denmark may not have the size to capture all positive externalities. Following the argument of fiscal congruency, this leads to suboptimal investment in the attraction of star scientists (Bretschger 1999). Thus, there is a case for a policy agenda on the supranational, i.e. the EU level (Schiller and Revilla-Diez 2008). Second, the division of the European economy in separate labor market areas for non-EU highly-skilled workers calls for centralization because of the following reasons: Small labor markets are less attractive for highly-skilled migrants than big ones (Weizsäcker 2006). In addition, the allocation of foreign highly-skilled individuals will be more efficient if they can move freely within the EU 27. Finally, an inflow of labor in one country affects the labor market equilibrium not only in the receiving country but also in other EU countries; if immigrants are not allowed to move between them, non-migrants have to move instead (Zimmermann 1995).

Taken together, national migration policies are potentially damaging in a spatial economy with the free flow of factors and goods (Zimmermann 2008). The advantages of a large labor market for researchers - an essential prerequisite for competing with the US - can be realized only by harmonizing parts of the migration legislation at the EU level. Alas, given the substantial differences in country-specific preferences in migration matters and the unanimity criterion of the European Council for migration legislation, decisions towards enhanced efficiency of the EU labor migration policy are rather unlikely (Bendel 2008). Nevertheless, there is also an argument in favor of the regional level. Fiscal federalism suggests that decentralized decision making may be better suited to regional needs. Regional policy makers have a superior knowledge about skills needed in the regional economy. Hence, centralized EU immigration policy should be complemented by the decentralized formulation of needs on the regional level. Alas, both EU initiatives to centralize highly-skilled immigration policy, i.e. the blue card and the Scientific Visa, failed to create an integrated and homogenous EU labor market for non-EU highly-skilled workers. They both started with ambitious initiatives from the European Commission but failed to overcome national economic protectionism and cultural differences between the EU member states.

4.2 Horizontal policy coordination

Horizontal policy coordination denotes the coordination of policy actions between different policy fields, typically associated with different ministries. Besides migration policy Figure 1 depicts eight additional policy fields that are of – increasing - relevance in shaping the competitiveness of Europe as a location for talent. Four crucial horizontal coordination tasks

are presented. First of all, university policies foster exchange between researchers and students but migration policies inhibit short-term visits of academic scholars due to a highly-restrictive granting of visas for academics in a number of EU countries (OECD 2006). Second, a number of European mobility programs support a stay abroad for European academics; the location typically chosen is the US. While this is in principle a wise strategy to tap foreign knowledge pools, it has to be ensured that these scientists have the possibility to return and to apply their new knowledge in Europe. Sending students and scholars abroad without concomitantly upgrading European universities and providing attractive return possibilities fosters harmful brain drain of students and academics instead of benign brain circulation. “Network-based competition” with advantages for national, immobile talent as opposed to “excellence-based competition” (Pottelsberghe 2009) for tenure positions at European universities systematically impedes the reintegration of national talent residing abroad into national innovation and university systems (Morano-Foadi 2005). Third, despite the free mobility of labor inside the Common Market legally guaranteed since the Treaty of Rome in 1957, mobility is still low and the associated costs are frequently prohibitive. One reason for this is the limited portability of social security claims such as pension rights between different countries (Boeri and Brücker 2005). Hence, coordination between mobility and social policy would be necessary to reduce mobility penalties. In this respect, Pottelsberghe (2009) suggests pension scheme for academic researchers valid throughout the EU. Fourth, policies to attract foreign talent have to be coordinated with developing policy if the source regions are located in developing countries. For example, the EU blue-card was heavily criticized by Kancs and Ciaian (2007, p. 36): “Blue Cards (BC) will harm the innovative capital and hence long-term growth in the less developed sending countries considerably more than other forms of labour migration, because both migration incentives are higher and the adverse selection of migrants is higher under BC.” Yet, recently published research results like the “new economics of brain drain” suggest a much more nuanced view on brain drain from developing countries, emphasizing the possible gains from brain circulation and the positive externalities on human capital investment accruing from the prospect of emigration (Saxenian 2006, Stark 2006, Agrawal et al 2008). Hence, there is a need to carefully coordinate attraction policies with development policies to avoid adverse distributional effects between sending and receiving regions and to ensure win-win outcomes for developed and developing countries (OECD 2006).

4.3 Lateral policy coordination

The success of BCP depends inter alia on the coordination between structural issues and technical issues (Mahroum 2005). While the former are factors shaped by tradition and culture (e.g. meritocracy, xenophobia, attitudes towards technology and research...), the latter include issues that are directly linked to legislation (e.g. immigration regimes, taxation,...). The influence of policy on structural issues is only indirect and change may take

a long time. By contrast, technical issues are under the direct influence of the state. Quite a few BCP initiatives lack the proper balance between developments in structural and technical issues and thus fail to achieve the proposed policy goals (Mahroum 2005, OECD 2006). Among others, the following two lateral coordination issues are relevant for the European context. First, a number of European countries including Austria display a very and increasingly restrictive asylum and immigration policy for low-skilled workers which, together with the questionable results of integration policy, increases xenophobia (Zimmermann 1995). Nevertheless, these countries concomitantly hasten to open the borders for highly-skilled workers. Besides the question of humanity, such restrictive policies may produce negative spillovers, giving those countries a bad image and lowering the prospects of attracting highly-skilled individuals by increasing the entry barriers because of negative attitudes towards foreigners (Haas 2008). Such images and attitudes as typical structural issues can only be changed in the long run. Second, language is a typical structural feature of states. Europe has several languages; most of them are hardly taught outside Europe and most of them are rather irrelevant for cutting-edge research. Hence, states like the UK, the US or Sweden where the university system turned to English as lingua franca several decades ago have an important linguistic advantage based on two factors: First, English is taught in a large number of countries and it is the main language of science. The importance of English language skills is underlined by the empirically results from Bauwens et al (2008): If France improved its proficiency in English by 10% (i.e. approaching the level of the Netherlands), the number of highly-cited French researchers would increase in the long run by 25%. Graduate teaching and publishing ought to be done in English if reforms of technical issues (e.g. lowering immigration barriers for foreign academics) shall be successful (Zimmermann 2008, Bauwens et al 2008). An additional positive outcome of such reforms would be the creation of a more homogenous European labor market for academic researchers and a boost for the European Research Area.

5 Complementarities in BCP

Policy makers face a fundamental decision in designing BCP: Should the region rely on internal human resources and enhance their education and utilization, or should the region attract external human resources (Straubhaar 2000). Accordingly, internal brain competition policy is defined as all policy measures which aim at fully utilizing intraregional human capital. External brain competition policy comprises all policy actions supporting the utilization of extraregional human capital. Whereas current policy measures are predominantly external BCP measures, it is important to acknowledge the strategic role of internal BCP. Catching-up processes and demographic ageing in traditional labor source countries such as the CEE countries and the BRICs result in a growing number of countries that compete to attract the same pool of human capital. Hence, it becomes increasingly

risky to solely rely on a permanent inflow of external human resources (OECD 2009, EC 2007).

The specific relevance of internal BCP in the European context consists of four factors. First, European economies fail to adequately utilize foreign talent residing in Europe according to their educational level significantly more often than non-EU OECD countries. Italy, for example, has a twice as high over-qualification rate as the US or Canada (OECD 2008). Since part of this brain waste might be attributed to the high level of labor market protection in Europe, this is a specific European problem (Boeri and Brücker 2005, Sapir 2007). Second, brain drain of European talent demonstrates that even natives are unsatisfied with their situation. This is a clear indication of the relatively unfavorable conditions inside the European university and business sector. Third, European labor markets are characterized by lower mobility levels, even among the highly skilled (Asheim 2009). Hence, European policy makers, especially on the regional level, cannot rely as much as their American counterparts on external human capital as suggested by Florida; the utilization of internal human capital relatively gains in importance (Hansen and Niedomysl 2009). Fourth, the accumulation and utilization of regional human capital is especially important for those regions whose industrial base is made up of industries with a synthetic knowledge base. Such industries rely more heavily on path-dependently accumulated tacit knowledge, embedded in a specific industrial and regional setting frequently characterized by strong social ties and social propinquity (Asheim and Gertler 2004). Following the varieties of capitalism approach and the knowledge base literature, the industrial core of European coordinated market economies is based on diversified quality production and a synthetic knowledge base whereas Anglo-Saxon liberal market economies are based on high-tech and project-oriented industries with an analytical knowledge base (Hall and Soskice 2001, Høgni Kalsø and Asheim 2005, Asheim 2009). Hence, intraregional human capital formation organized by region- and firm-specific education and training institutions and stability of the regional labor force is relatively more important in the European than in the US context. Eventually, internal and external BCP are interrelated because of a number of crucial complementarities between them (Fig 2). There are three outstanding complementarities: A knowledge complementarity, an attraction complementarity and a retention complementarity.

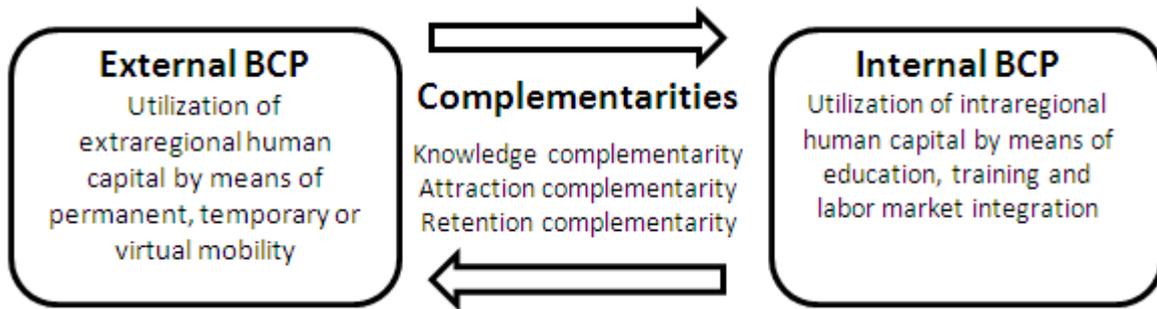


Figure 2: Complementarities between internal and external BCP

5.1 Knowledge complementarity

On the one hand, an effective internal BCP in the sense of a well-trained and integrated regional workforce increases the absorptive capacity of the regional innovation system and the utilization of external knowledge spillover agents. On the other hand, regional economies may face some knowledge gaps if the knowledge of foreign talent systematically differs from the intraregionally produced knowledge. In this case, the knowledge of extraregional talent complements the knowledge of intraregional talent. Several cases can be mentioned: First, institutional knowledge about foreign markets or language skills are essential for export-oriented industries and the opening of new markets. Second, different universities or research institutes produce different qualities in output. For instance, it may be very difficult for a small peripheral university in Europe to educate students who can be regarded as substitutes for graduates from the MIT or Harvard University. Third, taking into account that invention activities are a spatially highly uneven phenomenon, it is clear that some regions have a head start due to the accumulation of new and unique knowledge. It is impossible to replace a highly-skilled professional who received working experiences in the leading region by national or regional professionals.

5.2 Attraction complementarity

An effective internal BCP results in a higher competitiveness in attracting extraregional talent. This is due to a number of factors: First, Europe fails to efficiently utilize foreign talent (see above). From a microeconomic perspective of migrant networks, this will result in suboptimal outcomes: As long as foreign talent systematically fails to reap their expected returns from human capital investments, rational migration and diaspora networks will communicate these suboptimal labor market outcomes, and positive externalities from chain-migration may be forestalled (Locher 2003). Second, a region without a substantial stock of foreign talent has to start from scratch in order to become an attractive location. Markusen (2008) suggests a human capital strategy which initially focuses on high-quality

education and training institutions matching with the demand of the regional labor market. “The goal is to build a regional identity around key occupations that allows it to be known as a ‘place to be’ for that occupation” (Markusen 2008, p. 59). Based on this specialization, i.e. regional occupational and industrial clusters, the attraction of external talent may become possible. This points out the relevance of establishing visible and viable regional clusters with a close coordination between industry and universities (Bramwell and Wolfe 2008). Regions will not succeed in the attraction of specific skills if there are no sufficient relations between potential incomers and regional universities or firms. In other words: “Instead, regions may have to pay more attention to the human resources already present in the region (or with social links to the region) and base planning policies upon them” (Hansen and Niedomysl 2009, p. 203).

5.3 Retention Complementarity

An effective internal BCP is an important factor inhibiting brain drain. A large part of the brain drain results from insufficient conditions and opportunities in the home region. Individuals facing the danger of brain waste and seeing better academic or economic opportunities abroad will “vote by feet” in order to reap the benefits of their human capital investment or to make an additional human capital investment e.g. by working together with star scientists in the respective field. Hence, one way to retain talent is to provide and facilitate attractive labor market conditions and possibilities to upgrade their knowledge. A case in point are the differences in university governance and structure between Europe and the US. A negative net-migration outflow of European PhD students to US universities with a concomitantly low ability to attract non-European PhD students to Europe raises the question of political countermeasures (Moguerou 2006, Cervantes and Goldstein 2008). While the concentration of star scientists in the US provides an important pull factor for European PhD students, the design of European PhD programs also acts as a substantial push factor. The traditional European PhD program is based on the “apprenticeship model”, while the Anglo-Saxon universities offer a “professional model” for their PhD students. While the former consists of an individualized professor-student relationship, the latter is a structured program where the whole institute or department is responsible for the education of the PhD students. Contrary to the European apprenticeship model, professional models provide students with a number of courses tailored to their specific needs and with a wider range of advisers supporting research endeavors. Hence, the promotion of competitive graduate schools along the lines of the “professional model” in European universities would enhance the attractiveness of European PhD programs and foster the retention of European graduate students (Aghion et al. 2008).

Taken together, external and internal BCP are intrinsically tied together. The efficiency and effectiveness of the former fundamentally depend on the proper-functioning of the latter.

Increasing Europe's competitiveness in the competition for talent should include external as well as internal BCP.

6 How to lure foreign talent to Europe?

In reality, regional and national governments and development agencies apply a number and mixture of strategies to lure external talent. For analytical clarity, section 6.1 outlines four ideal types of frequently observed strategies; 6.2 discusses complementarities between several of the strategies presented in 6.1.

6.1 Strategies in talent competition

Conceptually, four strategies to lure foreign talent can be distinguished (Tab. 2): Immigration policy, return policy, circulation policy and diaspora policy. Immigration and return policy are characterized by attracting foreign highly-skilled workers with the aim of making them permanent residents. Brain circulation policy refers to all policy measures promoting the temporary attraction of external highly-skilled workers to the respective region, enabling face-to-face contact between regional and external talent. Diaspora approaches comprise all policy measures which serve to utilize national talent abroad, i.e. in the absence of geographical proximity. Which of these four strategies should be applied by policy agents to maximize the gains from knowledge spillover agents? Three relevant concepts are applied to derive rationalities for a differentiated application of these strategies: proximity, knowledge base and varieties of capitalism.

Table 3: Strategies for external BCP

Type of BCP	Immigration policy	Return policy	Circulation policy	Diaspora policy
National affiliation	Foreign talent from developed and developing countries	National talent	Foreign and national talent	National talent (Expatriates)
Spatial dimension	Incoming mobility	Incoming mobility	Incoming and outgoing mobility	Virtual mobility
Temporal dimension	Long-term	Long-term	Short-term	Variable
Structure of interaction	Face-to-face	Face-to-face	Face-to-face	Epistemic and ethnic network
Prevalent forms of proximity	Geographical proximity	Geographical proximity; institutional proximity; social proximity	Temporary geographical proximity; organizational proximity	Institutional proximity; social proximity
Appropriate knowledge base	Synthetic knowledge base	Synthetic knowledge base	Analytical knowledge base	Analytical knowledge base
Policy instruments	Immigration regime; attractive arrangements for spouses and children; language learning support; top-notch research infrastructure; open and multicultural climate	Provision of attractive positions as a means of career advancement; mobility reward; top-notch research infrastructure; attractive arrangements for spouses and children	Mobility programs; research collaboration; housing for short-term visits; internships; visiting professors; facilitate entrance via short-term visas; conferences; summer schools	Video conferencing, career fairs; network initiatives; information on national developments, online job markets
Limitations	Absence of positive externalities as a result of weak chain migration effects; high entry barriers because of xenophobia; lack of adequate and competitive job or education opportunities	Adverse selection: Only underperforming individuals return from abroad; lack of adequate job opportunities; red-tape and loss of social capital necessary to achieve job promotion	Unwillingness of policy agents and firms to foster circulation; high levels of fluctuation inhibit learning and innovation processes especially in industries relying on a synthetic knowledge base	No incentives for the diaspora to cooperate with political and private actors in the source regions; low levels of knowledge spillovers because of geographical and/or organizational distance

Based on: Lowell 2001, Davenport 2004, Boschma 2005, Maskell 2006, Torre 2008

Following traditional innovation research, tacit knowledge can only be exchanged under conditions of permanent co-location, for example in regional clusters. If this is the case, then the only two effective BCP strategies might be immigration and return policy. However,

recent research on proximity revealed that the necessary conditions for effective knowledge exchange are much more complicated, stressing the importance of thinking in different kinds of proximity (Boschma 2005, Torre 2008). Only few projects demand a permanent exchange of tacit knowledge: "More specifically, the process of knowledge transfer can often take place between distant partners; however, at certain stages of this process, face-to-face interactions are essential for the successful completion of the operations of production of goods and innovations" (Torre 2008, p.882). Accordingly, circulation policy can be an effective strategy to foster knowledge spillovers by providing or supporting "temporary clusters" (Maskell et al. 2006). Furthermore, other forms of proximity may act as substitutes for geographical proximity. This can be the case if, for example, common working experiences lead to social and organizational proximity which enables tacit knowledge transfer even over great distances, thereby providing some rationale for the diaspora strategy (Boschma 2005, Agrawal et al. 2008). Thus, diaspora policy is a viable strategy to connect e.g. the national academic researchers with their former peers residing abroad. The notion of national talent based on geographical proximity is thus transformed to one which stresses common national affiliation and at least institutional proximity (Davenport 2004).

In the absence of institutional, organizational or social proximity, it can be shown that spatial proximity gains in importance because it can compensate for a lack of other forms of proximity (Ponds et al. 2007). A case in point is the cooperation between science and industry, where organizational distance increases the need for spatial proximity to ensure effective interaction. Furthermore, the founding of firms by academic entrepreneurs is often a highly localized event. Zucker and Darby (2007, p.14) give a simple reason for this in their study on star scientists who became firm (co-) founders: "Finding time and resources to do all that they are doing is an ongoing struggle and they rarely become involved in starting companies or transforming existing ones very far from where they are doing the rest of their work." It is exactly this importance of spatial proximity which motivates Zucker and Darby (2007) to sound the alarm for star scientists leaving the US. Taken together, science-industry interaction and firm foundations seem to rely very much on more permanent levels of spatial proximity, thereby clearly pointing out the limitations of circulation and diaspora policy (Bergman and Schubert 2005). Different BCP strategies enable different types of knowledge spillovers, which emphasizes the need for a selection of the required strategies for various circumstances.

Another filtering variable for selecting appropriate BCP strategies is provided by the knowledge base and varieties of capitalism approach (Hall and Soskice 2001, Asheim and Gertler 2004). To exchange knowledge and to benefit from knowledge spillovers, it is necessary to have a sufficient amount of common knowledge (Fujita 2007). This common knowledge base may be more present in industries which rely on an analytical knowledge base. The predominance of ubiquitous codified knowledge and general skills provides firms and highly-skilled workers with a rather similar knowledge. Thus, external talent entering

the local labor market may find it not very difficult to sell his or her knowledge in science based industries since there are rather low barriers for “learning by hiring”. The examples of brain circulation given by Saxenian (2006) rest exactly upon those types of industry that provide the conditions for a high inter-company mobility and short-term labor contracts for specific projects. Hence, diaspora and circulation policy might be appropriate strategies for industries relying upon an analytical knowledge base. Clearly, these two strategies are also suited for designing mobility policies for the university sector that almost naturally relies on an analytical knowledge base. Last but not least, diaspora policies are potentially relevant for European policy-makers simply because Europe has a comparatively huge highly-skilled diaspora as a result of high brain drain rates (see table 1). Establishing effective networks that connect the diaspora with the European scientific base may even change the role of policy agents: “As a consequence, policy makers ought to become mediators and boundary-spanners rather than creators and dominators (...)” (Bathelt 2006, p. 231).

However, as shown in table 1, the European business sector substantially differs from the US business sector. A larger share of low and middle-tech industries relying more on a synthetic knowledge base with a higher importance of tacit knowledge and firm-specific skills of the workforce strongly lowers the possibilities for short-term oriented labor contracts and brain circulation. According to Hall and Soskice (2001), coordinated market economies are based upon technology transfer by means of inter-company relations, facilitated e.g. by business associations and not by the interfirm mobility of highly-skilled workers or by poaching corporate researchers and engineers from competitors. Long-term labor contracts and a high degree of firm-specific knowledge are important institutional complementarities for the competitiveness of the European “diversified quality production” (DQP) system. Taken together: “The more dominant tacit knowledge is, the more embedded knowledge creation becomes in local institutions the more difficult it becomes for outsiders to enter and to contribute to the industrial setting. Hence, migration of talent into these types of industries does not gain much from temporary visits” (Høgni Kalsø and Asheim 2005, p. 19). Accordingly, policy actions aimed at attracting engineers and corporate researchers to the European business sector should not be based upon prescriptions derived from the experience of ICT industries in Silicon Valley and models of brain circulation. Instead, strategies should have the long-term settlement and skill-adequate integration of foreign talent into regional labor markets as their aims. Of course, European high-tech firms provide all preconditions for successful brain circulation and diaspora policies. However, the underlying assumption here is that these are not the industries that make up the industrial core in European countries (Dosi et al 2005, Asheim 2009).

6.2 From brain drain to brain gain

While the different BCP strategies outlined above are appropriate for specific economic contexts, there is also the need to discuss the complementarities of these approaches. The

following discussion centers on the mobility of academic talent. The starting point is the presumption of an outflow of academic talent from the regional economy. Generally, this outflow can be intended by an internationalistic research policy common in Nordic countries to enable native talent to study abroad and learn from foreign researchers in their field of study. The unintended outflow due to relatively unfavorable conditions in the home region constitutes the precondition of the classical brain drain. Whereas the microeconomic incentives offered by mobility programs for academics are typically designed to induce the return migration of native talent after their research sojourn abroad, equivalent incentives are either absent or ineffective in the case of brain drain. However, case studies revealed that even intended outgoing mobility may result in brain drain because of barriers to re-enter national tenure-track positions at universities in the home country. Accordingly, the questions arise how to make sure that the benefits from foreign research experiences can be captured by the home region and how to prevent the permanent brain drain of unintended outmigration. Figure 3 suggests a strategy mix for the case of Austria, based on the complementarity between diaspora, circulation and return policy (Reiner 2009).

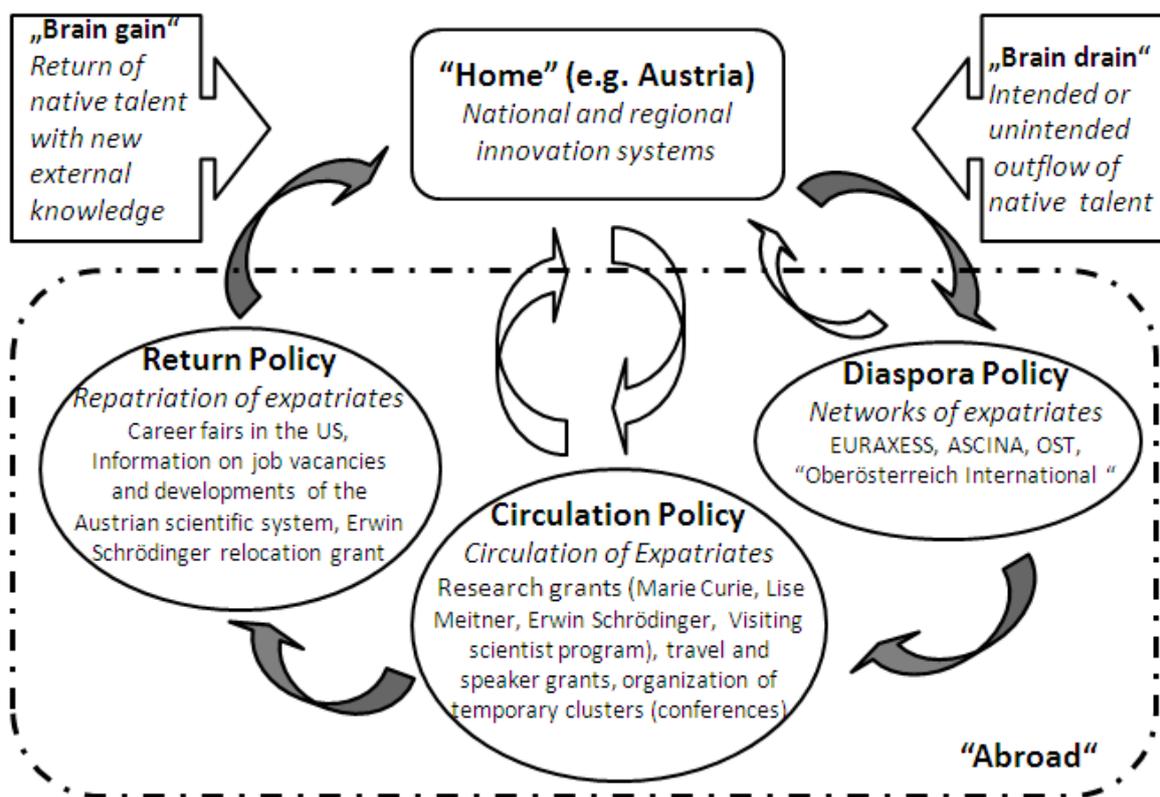


Figure 3: Complementarities between external BCP strategies. The case of Austria

To begin with, the outflow of talent should be accompanied by diaspora policy in order to stay in contact with the native talent residing abroad and to avoid losing track. Several network and alumni organizations are needed to manage contacts. After some time, brain

circulation policies is suitable to intensify the contacts via face to face contacts at conferences in the home region and research collaborations with home-based universities. Programs that support and organize temporary study sojourns in the home region must be available at this stage. All this will maximize the probability of return in a third step. Return policy can support the relocation of native talent to the home region via a number of policy actions such as active job offering for native academics residing abroad or relocation grants. An example in this respect is the most important Austrian outgoing program for post-docs, the Erwin Schrödinger program, which is supplemented by a specific relocation grant for up to 12 months to facilitate the reintegration of native talent.

7 Conclusions

In the course of the emerging knowledge economy and the implementation of policy strategies such as the European Lisbon Strategy, highly-skilled individuals have become much more important in national, regional and sectoral development strategies. These developments are reflected in a recently-proposed paradigmatic shift in regional policy from an emphasis on physical capital to human capital. However, prominent contributions from the US such as those from Florida (2002, 2007) or Saxenian (2006) are only partially appropriate for the European context. As a consequence, a framework denoted as brain competition policy (BCP), explicitly adopting a European perspective, has been conceptualized.

Surely, the concept proposed will not solve all problems and ambiguities. There is some need for further empirical and theoretical research: First, different regions display different premises and needs concerning highly-skilled workers (Tödtling and Trippl 2005). Which form of BCP is appropriate for which type of region? There may be regionally different routes to achieve the same goal. Second, as a result of the recent introduction of BCP-actions, evaluations are strongly needed in order to avoid waste of public resources and to foster evidence-based policy approaches (OECD 2009). Third, there is a reason to assume that BCP triggers some quite substantial spatial, personal and functional distributional consequences (Peck 2005). If social coherence is considered as an important policy goal, not least to sustain public support for immigration policy and open innovation networks, these trade-offs and conflicts of interest have to be investigated and integrated into policy strategies.

Despite all the efforts of European countries and regions to become more attractive locations for highly-skilled workers, there are good reasons to be cautious concerning their immediate success. The creation of effective migration channels for the influx of foreign talent requires time and resources; governments have to invest in these networks with a long-term perspective (Zimmermann 2008). Once such networks have been established, they work in a self-reinforcing manner. Nevertheless, the situation for implementing such

policies can be advantageous, because of a policy change in the US after the terrorist attack in 2001 and the beginning of recession in 2008 (Zucker and Darby 2007, Wadhwa 2009). Both events triggered nationalistic responses, weakening the US as a global talent magnet due to strongly decreased quotas for the H-1B visas and stimulus packages favoring natives to foreigners in the job market. Sadly, the EU seems to be rather ill-prepared to capitalize on this window of opportunity by redirecting global knowledge flows and human capital from the US towards European regions. The discussion of and resolution on the EU blue card demonstrated that the EU is, as far as immigration policy is concerned, more a bunch of nation states separated by tight borders than a space for the free movement and circulation of knowledge spillover agents fostering innovation and growth in Europe.

References

Aghion P et al. (2008) Higher aspirations: An agenda for reforming European universities. Bruegel Blue Print No 5

Agrawal A, Cockburn I, McHale J(2009) Gone but not forgotten: knowledge flows, labor mobility and enduring social relationships. *Journal of Economic Geography* 6: 571-591

Agrawal A, Kapur D, McHale J (2008) Brain drain or brain bank. The impact of skilled emigration on poor-country innovation. NBER Working Paper Series No 14592

Aiginger K, Guger A (2006) The European socioeconomic model. In: Giddens A, Diamon P, Liddle R (eds) *Global Europe, social Europe*, Polity Press, Cambridge

Angenendt S, Parkes R (2008) Steering labour migration to the EU – perspectives. SWP Comments No 12

Arntz M (2006) What attracts human capital? Understanding the skill composition of interregional job matches in Germany. ZEW Discussion Paper No 62

Asheim B (2009) Guest Editorial: Introduction to the creative class in European city regions. *Economic Geography* 85: 355-362

Asheim B, Gertler M (2004) The geography of innovation. Regional innovation systems. In: Fagerberg J, Mowery D, Nelson R (eds) *The Oxford handbook of innovation*, Oxford University Press, Oxford

Bathelt H (2006) Geographies of production: growth regimes in spatial perspective 3 – toward a relational view of economic action and policy. In: *Progress in Human Geography*, 30: 223-236

- Bathelt H, Malmberg A, Maskell P (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. In: *Progress in Human Geography* 28: 31-56
- Bauwens L, Giordano M, Thisse JF (2007) The resistable decline of European Science. CEPR Discussion Paper No 6625
- Bendel P (2008) Europäische Migrationspolitik: Ein stimmiges Bild? In: *Aus Politik und Zeitgeschichte* 35-36: 14-19.
- Bergman E, Schubert U (2005) Spillovers and innovation, environment and space: policy uncertainties and research opportunities. In: Maier G, Sedlacek S (eds) *Spillovers and innovations. Space, environment and the economy*, Springer, Vienna, New York
- Boeri T, Brücker H (2005) Why are Europeans so tough on migrants? In: *Economic Policy* 44: 631-703
- Boschma RA (2005) Proximity and innovation: A critical assessment. *Regional Studies* 39: 61-74
- Boschma R, Fritsch M (2009) Creative class and regional growth: Empirical results from seven European countries. In: *Economic Geography* 85: 391-423
- Bramwell A, Wolfe D (2008) Universities and regional economic development: The entrepreneurial university of Waterloo. In: *Research Policy* 37: 1175-1187
- Bretschger L (1999) Knowledge diffusion and the development of regions. *The Annals of Regional Science* 33: 251-268
- Burkert C, Niebhur A, Walper R (2007) Regional disparities in employment of high-skilled foreigners – Determinants and options for migration policy in Germany. HWWI Research Paper No 3-7
- Coniglio N, Prota F (2006) Human capital accumulation and migration in a peripheral EU region: the case of Basilicata. *Papers in Regional Science* 87: 77-96
- Davenport S(2004) Panic and panacea: brain drain and science and technology human capital policy. *Research Policy* 33: 617-630
- Deutsche Bank Research (2009) Dynamische Vielfalt als Chance. *Mittelstand international*. Aktuelle Themen No 441
- Dijk J, Folmer H, Oosterhaven J (2009) Regional policy: rational, foundations and measurements of its effects. In: Capello R, Nijkamp P (eds) *Advances in regional economics*, Edward Elgar, Cheltenham, UK

Döring T, Schnellenbach J (2006) What do we know about knowledge spillovers and regional growth?: A survey of the literature. *Regional Studies* 40: 375-395

Dosi G, Llerena P, Sylos Labini M (2005) Science-technology-industry links and the "European Paradox": Some notes on the dynamics of scientific and technological research in Europe. LEM Working Paper Series No 2

EC (2000) Towards a European research area

EC (2007) Towards a European research area. Science, technology and innovation. Key figures 2007

EC (2008): The concept of cluster policies and their role for competitiveness and innovation: Main statistical results and lessons learned. PRO INNO Europe paper No. 9

Florida R (2002): The economic geography of talent. *Annals of the Association of American Geographers* 92: 743-755

Florida R (2007) *The flight of the creative class*, Collins, New York

Fromhold-Eisebith M (2002) Internationale Migration Hochqualifizierter und technologieorientierte Regionalentwicklung. *IMIS-Beiträge*: 21-41

Fujita M (2007) Towards the new economic geography in the brain drain society. *Regional Science and Urban Economics* 37: 482-490

Gächter A (2007) Migration policies for the highly skilled: The case of foreign graduates. In: Tarrosy I, Milford S (eds) *European higher education in a changing world. A review from the Danube region*, Publikon Books, Pécs

Gertler M (2008) Book review. The new argonauts: Regional advantage in a global economy. *Economic Geography* 84: 105-108

Gertler M (2003) Tacit knowledge and the economic geography of context, or the undefinable tacitness of being (there). In: *Journal of Economic Geography* 3: 75-99

Giddens A (2005) The world does not owe us a living. In: *Progressive Politics* 4.3: 6-12

Goldstein M, Cervantes A (2008) Talent mobility in the global economy: Europe as a destination. In: Solimano A (ed) *The international mobility of talent. Types, causes and development impact*, Oxford University Press, Oxford

Haas M (2008) Humanressourcen in Österreich. Eine vergleichende Studie im Auftrag des Rates für Forschung und Technologieentwicklung. Vienna

Hall P, Soskice D (2001) *Varieties of capitalism. The institutional foundations of comparative advantage*, Oxford University Press, Oxford

- Hansen HK, Niedomysl (2009) Migration of the creative class: Evidence from Sweden. *Journal of Economic Geography* 9: 191-206
- Heywood A (2007) *Politics*, Palgrave Macmillan, Hampshire
- Høgni Kalsø H, Vang J, Asheim B (2005) The creative class and regional growth: Towards a knowledge based approach. Centre for Innovation, Research and Competence in the Learning Economy, Working Paper No 15
- ILO (2006) *Competing for global talent*. Geneva
- Kancs DA, Ciaian P (2007) Blue cards, blue prospects? Centre for Institutions and Economic Performance, LICOS Discussion Paper Series No 194
- Kesselman J (2001) Policies to stem the brain drain - without Americanizing Canada. In: *Canadian Public Policy* 27: 77-93
- Kolb H (2005) The German "green card". Focus Migration. Policy brief
- Krugman P (1991) *Geography and trade*. MIT Press, Cambridge
- Laranja M, Uyarra E, Flanagan K (2008) Policies for science, technology and innovation: Translating rationales into regional policies in a multi-level setting. *Research Policy* 37: 823-835
- Locher L (2003) Netzwerkmigration. *Wist*: 161-163
- Lowell L (2001) Policy responses to the international mobility of skilled labour. ILO International Migration Papers No 45
- Lucas R (1988) On the mechanics of economic development. *Journal of Monetary Economics* 22: 3-42
- Lundvall BA, Borrás (2006) Science, technology, and innovation policy. In: Fagerberg J, Mowery DC, Nelson R (eds) *The oxford handbook of innovation*, Oxford University Press, Oxford
- Mahroum S (2005) The international policies of Brain Gain: A Review. *Technology Analysis & Strategic Management* 17: 219-230
- Markusen A (2008) Human versus physical capital. Government's role in regional development. In: Martinez-Vazquez J, Vaillancourt F (2008) *Public policy for regional development*, Routledge, Abingdon
- Maskell P, Bathelt H, Malmberg A (2006) Building global knowledge pipelines: The role of temporary clusters. *European Planning Studies* 14: 997-1013

- Meißner A, Bielefeld F (2007) Competition for Talents. Probleme und Handlungsempfehlungen speziell für mittelständische Unternehmen. In: *Wist* 8: 394-399
- Moguerou P (2006) The brain drain of PhD.s from Europe to the United States: What we know and what we would like to know? EUI Working Papers No 11
- Möller J, Tubadji A(2008) The creative class, bohemians and local labor market performance. ZEW Discussion Paper No 135
- Morano-Foadi S (2005), Scientific mobility, career progression, and excellence in the European Research Area. *International Migration* 5: 134-162.
- Newland K, Agunias DR, Terrazas A (2008) Learning by doing: Experiences of circular migration. Migration Policy Institute
- Oates W (2005) Toward a second-generation theory of fiscal federalism. In: *International Tax and Public Finance* 12: 349-373
- OECD (2006) Policies for migration and development: A European perspective. Policy Brief No 30
- OECD (2008) *The global competition for talent: Mobility of the highly skilled*, Paris
- OECD (2009) The global competition for talent. Policy brief
- Peck J (2005) Struggling with the creative class. *International Journal of Urban and Regional Research* 29: 740-770
- Peri G (2007) America's stake in immigration. *The Milken Institute Review*: 40-49
- Ponds R, van Oort F, Frenken K (2007) The geographical and institutional proximity of research collaboration. *Papers in regional science* 86: 423-444
- Pottelsberghe B (2009) Knowledge. In: Sapir A (ed) Europe's economic priorities 2010-2015. Memos to the new comission
- Porter M (1998) The competitive advantage of nations. In: Porter M (ed) *On competition*. Harvard University Press, Harvard
- Reiner C (2009) How to lure the new Argonauts? Brain competition policy in a small open European economy. In: *Mitteilungen der Österreichischen Geographischen Gesellschaft*, 151, forthcoming
- Sapir A (2007) European strategies for growth. In: Artis M, Nixon F (eds) *The economics of the European Union*. Oxford University Press, Oxford
- Saxenian AL (2006) *The new argonauts. Regional Advantage in a global economy*. Harvard University Press, Cambridge

- Schiller D, Revilla Diez J (2008) Mobile star scientists as regional knowledge spillover agents. IAREG Working Paper No 11
- Schmidtke O (2009) Einwanderungsland Kanada – ein Vorbild für Deutschland? In: *Aus Politik und Zeitgeschichte* 44: 25-30
- Sinn HW (2008) Introduction. In: *CESifo Forum* 9: 5-10
- Solimano A (2008) Causes and consequences of talent mobility. In: Solimano A (ed) *The international mobility of talent. Types, causes and development impact*, Oxford University Press, Oxford
- Stark O (2005) The new economics of brain drain. *World Economics* 6: 137-140
- Storper M, Scott AJ (2009) Rethinking human capital, creativity and urban growth. *Journal of Economic Geography* 9: 147-167
- Straubhaar T (2000) International mobility of the highly skilled: Brain gain, brain drain or brain exchange. Hamburg Institute of International Economics, Discussion Paper No 88
- Torre A (2008) On the role played by temporary geographical proximity in knowledge transmission. *Regional Studies* 42: 869-889
- Tödtling F, Tripl M (2005) One size fits all? Towards a differentiated regional innovation policy approach. *Research Policy* 34: 1203-1219
- Tritad A (2008) The brain drain between knowledge based economies: the European human capital outflow to the US. CEPII Working Paper Series No 08
- Veugelers R (2009) A lifeline for Europe's young radical innovators. Bruegel Policy Brief No 1
- Wadhwa V (2009) A reverse brain drain. *Issues in Science and Technology* 25: 45-52
- Weizsäcker (2006) Welcome to Europe. Bruegel Policy brief No 3
- Worldbank (2009) World Development Report 2009
- Zimmermann K (1995) Tackling the European migration problem. *Journal of Economic Perspectives* 9: 45-62
- Zimmermann, K (2008) Mobilitätspolitik in Europa. *Wirtschaftspolitische Blätter* 55: 199-208
- Zucker L and Darby M (2007) Star scientists, innovation and regional and national immigration. NBER Working Paper Series No 13547



Institut für Regional- und Umweltwirtschaft
Wirtschaftsuniversität Wien
Institutsvorstand : ao.Univ.Prof. Dr. Franz Tödting
Nordbergstraße 15
A-1090 Wien, Austria
Tel.: +43-1-31336/4777 Fax: +43-1-31336/705 E-Mail: ruw@wu.ac.at
<http://www.wu.ac.at/ruw>