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Dynamic Regions in a Knowledge-
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WORKING PAPERS

**Understanding Scientific Mobility:
Characteristics, Location Decisions,
and Knowledge Circulation. A Case
Study of Internationally Mobile Austrian
Scientists and Researchers**

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Understanding scientific mobility – Characteristics, motivation, and location decisions: A study of internationally mobile Austrian scientists and research professionals

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Abstract

In today's knowledge-based global economy, highly qualified people acting as carriers of knowledge are playing a crucial role for the growth and development of organizations, cities and regions. Top-talent is regarded as the major source of innovation and competitive advantage, particularly in science and research. Highly skilled and educated workers, such as scientists and scholars, who are transferring their embodied knowledge from one place to another through geographical mobility, are referred to as *knowledge spillover agents* (KSA). Considering this context it is important to develop an understanding of the motivational dynamics, location factors and knowledge flows associated with mobility decisions of scientists and researchers. Based on qualitative data from in-depth interviews with Austrian scientists who are either currently staying abroad or have already returned this explorative study identifies some characteristics of scientific mobility, investigates the most relevant push and pull factors as well as sheds some light on the motivational dynamics at the individual level.

1 Introduction

In the past years, there has been a growing recognition that knowledge and highly skilled individuals as “carriers” of knowledge are a key driving force for regional development, growth and innovation (Glaeser 2004, Florida 2002a, 2005). Given the importance of well-educated people for regional dynamism, the geography of talent and the mobility patterns of the highly skilled class are increasingly attracting the attention of both academic scholars and policy agents. The central purpose of this paper is to get a better understanding of the nature of spatial movements of scientific and research talent in light of their importance regarding knowledge transfer. We refer to talented individuals who transfer knowledge from one place to another by means of their mobility as “knowledge spillover agents”. Although the paper deals with highly skilled mobility and migration in general, a particular attention will be paid to the factors shaping mobility and location decisions of scientists and research professionals. In this paper we will deal with the following question:

“What are the characteristics, motivational dynamics and location factors behind mobility decisions of (Austrian) scientists and research professionals?”

Note that the theoretical background for this paper is identical to the review of literature discussed in a previous working paper of the same research team and therefore is not included again (Maier, Kurka, Trippl (2006) “Knowledge Spillover Agents and Regional Development: Spatial Distribution and Mobility of Star Scientists” presented at the DYNREG project meeting in Athens in 2007). The conceptual framework of this previous paper examined the role of highly skilled labour for regional dynamism, the relation between labour mobility and knowledge spillovers and the key factors for attracting and retaining talent, particularly in science.

For the convenience of participants of the DYNREG project meeting in Milan 2008 we exclusively present our empirical work which focuses on scientists and researchers as a specific group of talent. Based on an analysis of 17 qualitative interviews with Austrian scientists and research professionals who are either currently living and working abroad (expatriates) or have already moved back (returnees) we demonstrate that the process of making mobility decisions is highly complex and multifaceted at the aggregate and individual level.

2 Empirical Analysis

2.1 Methodology

In the following we will briefly outline the methodology of this empirical research. Three methodological aspects are covered: Research design, research instrument and data collection. Sample characteristics are discussed in the “results” section.

2.1.1 Research design

A qualitative research design is used to investigate the characteristics, location factors and motivational dynamics associated with mobility of scientists and research professionals. Since the study is confined to the case of Austria some country-specific conditions and aspects need to be taken into account when drawing conclusions. The data has been gathered through in-depth, structured (semi-standardized) interviews most of them conducted in person (mostly!). The interviewees were Austrian scientists and researchers from the private (firms and privately owned R&D laboratories) and public sectors (public universities and independent state-owned research institutes). The selection of interview candidates was not subject to any restriction of or focus on particular scientific disciplines. Candidates for an interview were selected regardless of the scientific discipline (e.g. the humanities, social sciences, natural and engineering sciences). Two categories of individuals were interrogated: Austrian scientists currently living and working abroad (expatriates) and Austrian scientists who have decided to move back to Austria (returnees).

The search for and selection of potential interviewees was significantly facilitated through the support of *Brainpower Austria*. It is an initiative launched by the Austrian *Federal Ministry of Transport, Innovation and Technology* (Bundesministerium für Verkehr, Innovation und Technologie – BMVIT) and run by the *Austrian Research Promotion Agency* (Forschungsförderungsgesellschaft – FFG). It offers various tailored service packages, which are free of charge to scientists and experts interested in a career in Austria as well as to Austrians working abroad wishing to get connected to the scientific community at home. Apart from freely accessible *online job listings* covering 80% of all online published R&D vacancies in Austria the services include grants for various purposes such as refunding of traveling costs for job interviews in Austria, refunding of traveling costs for completion of a project application in Austria, refunding of traveling costs for attending meetings or events in Austria and financial subsidies as well as other support for R&D-professionals wishing to relocate to Austria.

2.1.2 Research instrument

Basically the interviews were conducted according to interview guidelines which were prepared upfront. Although this partly means a standardization each interview was allowed to be open in the sense that the interviewer could chose the focus according to the nature development of the conversation. This quasi “instrument” (interview guidelines) consisted of four main parts: the “mobility background” covering aspects regarding previous geographic movements for either educational or professional reasons (1), “motivational dynamics” asking for the personal motives, reasons and barriers to going abroad or returning to Austria as well as the evolution of the latest

relocation and likelihood of further movements (2), identifying the most relevant “location factors” making the current place to work attractive and comparing the current location to other places regarding living and working conditions (3), “knowledge circulation” examining in how far exchange (mobility) of people also leads to exchange of knowledge (4)¹. The interview guidelines for expatriates and returnees differed only slightly.

2.1.3 Data collection

Initially, potential candidates were contacted through the Brainpower newsletter issue of June 1st, 2007 and could voluntarily make themselves available for an interview. The interviews were carried out during the period from the end of June to the beginning of September 2007. Each interview was scheduled to take an hour but usually took up to 30 minutes longer (80 minutes on average). If possible, the interviews were conducted face to face. Regarding returnees this did not pose a problem since they were located in Austria. But expatriate scientists are usually not that easily reachable. In most cases the interview could be carried out in Vienna during an event of Brainpower Austria or in combination with some other travel reasons. Nevertheless 3 out of 17 Interviews were performed via telephone. In order to guarantee the availability of complete and detailed data each interview has been audio taped. Additionally, written notes were taken during the interviews. In many cases the interviewees provided their CVs or they were available online. All interviews were conducted in German language. We want to explicitly stress the fact that consequently all direct citations of interview sequences appearing in this paper are our translations and paraphrases of interviewee statements.

¹ Note that results concerning part number 4 of the interview guidelines (“knowledge circulation”) are not subject to this paper but will be dealt with in a subsequent one.

2.2 Results

In this section of the paper we will present the results of the empirical study in detail. It covers general characteristics of scientific mobility, motivation and location factors for mobility decisions (going abroad and returning) as well as motivational dynamics at the individual level (*mobility orientation types* of Austrian scientists and research professionals). Unless it is important due to the nature of the underlying question results are presented irrespective of whether they are drawn from interviews with expatriates or returnees.

2.2.1 Sample characteristics

Table 2 summarizes some characteristics of the “sample”. Bearing in mind that this is a qualitative study the quantifications given in brackets (relevant number of interviewees) are only of minor importance. The descriptions given below intend to provide an overall impression and general background information on the persons interviewed.

In total 17 Austrian scientists and research professionals volunteered for an interview, as already stated above. A considerable majority of interviewees is male (15 out of 17) reflecting the well known under-representation of women in science and research. The 17 interviewees are quite unevenly distributed among the two groups of interviewees. Almost double the number of expatriates (11) has been interrogated as compared to returnees (6). This might indicate that returnees are less willing to give an interview since they tend to be of higher age and hold more advanced hierarchical positions typically associated with more responsibilities and thus less time and availability. This is supported by the fact that expatriate scientists in the sample are typically younger than their colleagues who have returned to Austria: 5 out of 10 expatriates are between the age of 26 and 30 whereas none of the returnees fell into this age category. Besides, expatriates interviewed are usually less professionally advanced than research professionals who have moved back home: among expatriates there are 2 Research Assistants / PhD candidates but no Top Scientist / Professor / Senior R&D-related Manager whereas it is exactly the opposite in the group of returnees. This reflects the generally known finding from migration research that people are more flexible and thus geographically mobile during early stages of their (professional) lives. Most scientists and research professionals in the sample work at (public) universities or non-university research institutions which are mainly state-owned. Only two interviewees; both belonging to the group of returnees; come from the private sector. Expatriates as well as returnees who have been interviewed are predominantly attributable to physics & chemistry (strongly overlapping) or microbiology & immunology (biotech-related disciplines). As far as the current (expatriates) or previous (returnees) locations are concerned English-speaking countries are highly represented: USA (9), Canada (3) and Australia (1). Apart from the leading role of North America, Scandinavia seems to be a popular place: Norway (2), Sweden (1). Most interviewees either have spent up to 3 or even more years at their current (previous) location abroad. One of the expatriates has already lived abroad for 9 years. One of the returnees returned to Austria after 12 years. Only two interviewees (returnees) have a family with children.

Table 2: Overview on sample characteristics

<i>Sample characteristics</i>	“Expatriates” <i>Austrian scientists and research professionals currently working abroad</i>	“Returnees” <i>Austrian scientists and research professionals having moved back home</i>
<i>Number of interviews</i>	11 (17 in total)	6 (17 in total)
<i>Gender</i>	Female (1) Male (10)	Female (1) Male (5)
<i>Age (in years)</i>	26 – 30 (5) 31 – 35 (2) 36 – 40 (4)	26 – 30 (0) 31 – 35 (1) 36 – 40 (5)
<i>Occupational Position / Stage of tenure track</i>	<ul style="list-style-type: none"> • Research Assistant / PhD Candidate (2) • Junior Scientist / Post Doc / Junior R&D-related Manager (6) • Senior Scientist / Associate Professor / R&D-related Manager (3) • Top Scientist / Professor / Senior R&D-related Manager (0) 	<ul style="list-style-type: none"> • Research Assistant / PhD Candidate (0) • Junior Scientist / Post Doc / Junior R&D-related Manager (1) • Senior Scientist / Associate Professor / R&D-related Manager (3) • Top Scientist / Professor / Senior R&D-related Manager (2)
<i>Institution / Sector (public/private)</i>	<ul style="list-style-type: none"> • University / public (6) • Firm / private (0) • Non-university independent research institution / mixed (5) 	<ul style="list-style-type: none"> • University / public (3) • Firm / private (2) • Non-university independent research institution / mixed (1)
<i>Scientific disciplines</i>	<ul style="list-style-type: none"> • Economics / Business (1) • Molecular Biology & Genetics (2) • Physics / Chemistry (3) • Microbiology (1) • Immunology (2) • Material Sciences (1) • Computer Sciences / IT (1) 	<ul style="list-style-type: none"> • Economics / Business (1) • Molecular Biology & Genetics (1) • Physics / Chemistry (2) • Microbiology / Immunology (2)
<i>Current / previous location abroad</i>	<ul style="list-style-type: none"> • USA (4) • Canada (3) • Norway (2) • Australia (1) • Japan (1) 	<ul style="list-style-type: none"> • USA (5) • Sweden (1)
<i>Duration of staying abroad / total time spent at the current / previous location abroad</i>	<ul style="list-style-type: none"> • Less than 1 year (2) • 1 to 2 years (1) • 2 to 3 years (4) • More than 3 years (4) 	<ul style="list-style-type: none"> • Less than 1 year (0) • 1 to 2 years (1) • 2 to 3 years (3) • More than 3 years (2)

Source: Own compilation

2.2.2 The mobility background – Shaping and facilitating future decisions!?

Out of the 17 scientists and research professionals interviewed only 2 have not been geographically mobile before they decided to relocate to their current (or previous) location abroad. Thus, it was the first time they were substantially mobile except for some minor travel activity such as international conferences and scientific meetings as well as vacation trips. Consequently, the majority of interviewees (15) have a considerable mobility background for either educational or professional purposes. Scientists and researchers obtain their foreign (work) experience in the following forms:

- internships at firms or non-university research institutions (e.g. 2 to 3 months)
- university exchange semesters/programs (e.g. half a year or a full year with *Erasmus* i.e.)
- full studies abroad (e.g. more than one year)
- short-term faculty exchanges and research visits (e.g. a few weeks up to one month)
- intermediate/medium-term research scholarships (e.g. 3 to 6 months for a particular project, diploma thesis or dissertation with an *Erwin Schrödinger* or *Marie-Curie* scholarship i.e.)
- long-term research employments/contracts (e.g. for several years)
- miscellaneous: stays abroad for specific purposes other than vacation (e.g. civil service, family reasons, Au-pair)

Except for one interviewee who explicitly states that the international mobility background had absolute no influence on the current (latest) location decision all other scientists and research professionals either implicitly or explicitly confirm the opposite. In general, previous (shorter-term) geographical mobility and foreign experience seem to influence (promote and/or facilitate) subsequent (longer-term) relocation decisions in three different ways:

1) Institutional & local familiarity

First and most important, previous research visits and mobility scholarships provide the opportunity for both parties involved to get to know each other. The expatriate scientist becomes familiar with the local research team, the institution and facilities as well as the environment and surroundings. At the same time the local team gets to know the personality, competencies and technical skills of the expatriate scientist. Very often the expatriate scientist is then hired for a permanent position abroad. This is illustrated by the following statement of an interviewee:

“I knew the acting people and the team from my short visits to Belgium and did not have to jump into the cold water. That significantly facilitated the decision to move abroad for such a long period of time. With short-term visits there is not much that can go wrong.”
(R4)

Another interviewee explains:

“Before I actually decided to move to Chapel Hill I have been there a couple of times within 3 years; for about 3 weeks each time and always for research purposes. A local professor with whom I closely worked together then offered me an employment contract and the opportunity to do my PhD in the U.S.” (R6)

2) International (mobility) experience

Secondly, international mobility and stays abroad of any kind provide the opportunity to gain new experiences regarding other people, foreign cultures and unfamiliar lifestyles. This may take some fear out of future decisions to move to any different country. Previous experiences help to cope with significant change and the uncertainty typically associated with the decision to relocate. But such experiences do not necessarily need to be personal ones. To some extent also secondary information and recommendations of friends play a role in this context. (Of course this reasoning somehow applies to all individuals with any degree of international experience!) Two interviewees put it this way:

“Somehow those two internships abroad have encouraged me to go to a foreign country again. Probably it would not have been so easy without this experience. One gets to know how it is to be away from home.” (E2)

“I knew from my university exchange year in Madrid that one can always benefit from a foreign experience, especially personally. I had a lot of fun and met new people. The new experiences and impressions were very enriching.” (E9)

In extreme cases this can lead to a so called “migrant socialization”. Living the life of a globetrotter with several locations around the world at different stages in life transforms an individual into a “global citizen” being able to live and work almost anywhere. The following statement illustrates this phenomenon:

“I have been grown up multi-culturally. My father is Iranian and we were always on the move. There were always international people around me. It’s very important for me to stay mobile and not to be static. This lifestyle almost is an addiction.” (E11)

“My parents have said to me: Get out and about! My father has worked, for instance, in Africa, so I have grown up in a family environment where it was quite common to be internationally mobile.” (R1)

3) Regional & cultural affinity

The third way how previous mobility decisions might effect subsequent ones is the individual attractiveness of particular geographic regions and cultures. Sometimes people visit certain places due to some special interest. They discover their affinity to this place and develop a degree of familiarity which makes them come back in the future. One interviewee particularly fits this pattern:

“In 1990 I interrupted my studies to do a round-the-world-trip but I ended up in Japan as a German teacher. [...] Of my 4 years in Asia I have spent 2.5 years in Japan. [...] Back home I took Japanese Studies at university in addition to business. [...] 10 years later I returned to Japan as a scientist. [...] Tokyo is Tokyo. I can’t live without Tokyo. It has some kind of dynamism that perfectly fits me. It’s my city, I just feel good there. [...] I am turning Japanese; it’s my second home.” (E11)

Another interviewee statement:

“I have always had a strong interest in Scandinavia. During my stay in Sweden where I worked on my diploma thesis for six months I got a good experience of Scandinavia. That’s why I also could imagine living in Norway for a longer period.” (E1)

2.2.3 Coming into moving – How does an assignment abroad actually come about?

Given a general will and basic readiness to be geographically mobile it is worth investigating how relocations of individuals actually come about. Basically there are two different ways how Austrian scientists and researchers get an assignment abroad:

The network (passively/reactive)

On the one hand an individual might get a job abroad through personal contacts and the extended network. Very often this happens accidentally by means of former colleagues, mentors or superiors who either recommend a person to another or hire somebody directly for a permanent position. “Contacts bring contracts” somehow is the rule of thumb which nails it to the point. Additionally, these people more or less go where the network takes them and do not have very specific ideas of locations. The following interviewee statement is a good example:

“A professor from Belgium, whom I knew from my short-term research visits, had been my thesis advisor. After my graduation we tried to figure out what to do together next. Since he recently accepted a position in Tucson, Arizona, he asked me if I would like to join him. Personally, I never would have thought of moving to the U.S.” (R4)

Self-initiative (actively/proactive)

On the other hand somebody might get the chance to do research in a foreign country through his or her own initiative and self-commitment. These scientists and researchers identify a particular institution or research group of interest and send their unsolicited applications or look for vacancies at online job-platforms. They typically apply for mobility scholarships and grants in order to “bring their own money” and thus are able to more or less choose where to go. In contrast to above, they exactly know the places they want and are strongly dedicated to go there. An interviewee says:

“I had decided to apply for a scholarship because then they would take me with open arms wherever I want. With the help of the Internet I have found the institute and my current boss in Sidney. I particularly looked at his CV and publication list. Other than that I didn’t know anything. It totally was a shot in the dark. [...] But the more fundamental criterion was the geographical decision for Australia, or to put it differently, that I didn’t want to go to the U.S. where most of my colleagues went due to more choice in our field of research.” (E2)

2.2.4 Going abroad ... and leaving Austria behind!

Here, we want to give answers to the following questions: Why do scientists and research professionals leave Austria and go abroad? What kind of places are they drawn to? What may prevent them from doing so? On the one hand we identify the reasons (motives, incentives, incitements, stimuli, etc.) which are either pushing or pulling Austrian scientists and research professionals abroad. On the other hand we examine potential restraints (barriers, obstacles, hurdles, etc.) which prevent Austrian scientists and research professionals from either leaving the place of origin or moving to the destination. Additionally we identify so-called mediating factors which influence the mobility decision without actually being reasons or restraints. Figure 1 provides an overview of the relevant factors.

This somehow implies the assumption that people are able to freely choose where to go. As we know that this is hardly the case in practice we have to keep in mind that the decision for a specific location is often the result of some important pre-conditions (see above! e.g. personal contacts). At the same time the option to reject a potential job-offer from abroad always remains.

Figure 1: Reasons (pushing vs. pulling) for and restraints (at origin vs. destination) to moving abroad mediated by certain additional factors

	<i>PUSH-ing away from the place of origin</i>	<i>PULL-ing towards the destination</i>
REASONS (<i>motives, incentives, stimuli, incitements, etc.</i>)	<ul style="list-style-type: none"> • Following recommendations and best practices of friends and colleagues • Enhancing scientific career prospects (back home) • Escaping from the lack of career opportunities at home 	<ul style="list-style-type: none"> • Making use of career opportunities abroad • Accepting a particularly unique offer abroad • Taking advantage of increased income and benefits • Searching for adventures and new experiences • Working with star-scientists at prestigious institutions • Exploiting top-quality research conditions and infrastructure • Appreciating a different working atmosphere and environment • Discovering a particular city, country, or culture of interest • Acquiring (English) language skills
Mediating factors		<ul style="list-style-type: none"> • Right timing and stage of life • Western quality of life and standard of living • Handling of application phase
RESTRAINTS (<i>barrieres, obstacles, hurdles, etc.</i>)	<ul style="list-style-type: none"> • Leaving behind family and friends • Breaking with the familiar environment and personal roots • Dropping out of the Austrian social welfare system 	<ul style="list-style-type: none"> • Dealing with immigration laws and regulations • Finding a job for a spouse • Lacking foreign language abilities • Being scared of the unknown
	<i>Preventing from leaving the place of ORIGIN</i>	<i>Preventing from moving to the DESTINATION</i>

Source: Own compilation

Pushing reasons

Following recommendations and best practices of friends and colleagues: Influential actors in the social environment of scientists and research professionals such as close friends and important mentors play a role in the decision to relocate. These people can act as incitements in two ways: They either exemplify a successful relocation to others through their own lives or prompt somebody into moving abroad through their insistent recommendations. An interviewee says:

“I wanted to go to Australia; to Sidney; and I particularly looked for opportunities there. But personally I didn’t know Australia before. I only had some second-hand experiences from an acquaintance; a colleague from university; who had lived there. His narrations and reports convinced me.” (E2)

Enhancing scientific career prospects (back home): In order to have a successful scientific career it is absolutely necessary, especially nowadays, to gain international work experience of several years, preferably in the U.S. *“Overseas experience is decisive for a career in Europe”* (E8) and *“one can improve his [or her] value on the job market”* (E6). Scientists and researchers are pushed abroad to enhance their career prospects, as the following interviewee statement illustrates:

“With foreign work experience I also have better chances to return again, better job- and career prospects. It is somehow necessary to leave the Middle-European cultural area to find a good job upon return.” (E8)

Escaping from the lack of career opportunities at home: Austrian scientists and research professionals are pushed to move abroad due to an unbearable domestic labour market in this sector, particularly regarding academia and non-private research institutions. Often there are no job-opportunities available in a particular field of research. And if there are positions they are only offered on a temporary basis. Thus, Austria only offers limited professional future perspectives to scientists and researchers. An interviewee describes his dissatisfaction:

“I moved to Jena because there was funding for me; not only because of more income but simply because of the fact that there was some income.” (E8)

Pulling reasons

Making use of career opportunities abroad: Scientists and research professionals are lured to the place with more and better job opportunities in terms of professional and hierarchical advancement. They are longing for promising labour market conditions, professional development, long-term contracts (permanent positions) and predetermined career schemes (tenure track options). An interviewee states:

“In the U.S. there simply are more opportunities; in every respect; generally it is a huge market in all areas. In Austria the contracts are a catastrophe. They are always temporary. If you have a family and house or other responsibilities it simply is impossible.” (E10)

Accepting a particularly unique offer abroad: Some scientists and researchers are pulled abroad by a particularly interesting job or assignment in the right field of research not available elsewhere. In one case this had been, for instance, a newly built and state of the art science & research park for the automotive industry. In another case it had been a special project in cancer research. An interviewee explains:

“That particular project was very closely related to my previous knowledge and skills. It was the logical continuation of my diploma thesis and thus matched my interests. The post was just perfect. I might also have accepted it, even if it would have been located in a different non-Scandinavian country.” (E1)

Taking advantage of increased income and benefits: It is not uncommon that scientists and research professionals are lured abroad by a significant pay rise, favourable tax rates as well as other benefits such as subsidized apartments. Almost all individuals interviewed mention financial gains in one or the other way. But a few interviewees even explicitly emphasize money and income as a motivating factor, as the following statement illustrates:

“Money is a very crucial point. My salary equals about XXX Euros after taxes each year and that’s not even top considering Japanese standards. Additionally, I get my own independent research budget each year from the university which I can splurge on what I want.” (E11)

Searching for adventures and new experiences: In addition to new professional experiences scientists and research professionals are also pulled abroad in search of personal enrichment. Based on some degree of adventurousness and curiosity they want to escape from daily routine and broaden the personal (and professional) horizon. Central to this motive is the personal learning potential due to change and new environments. An interviewee tells:

“I wanted to see something new and get to know other people; their attitudes and ideas. Not just for a short period as on vacation but for real. Once in my life I wanted to leave Austria and see how it is living in a different country.” (R2)

Working with star-scientists at prestigious institutions: Scientists and research professionals often see a strong incentive to move abroad in the opportunity to work with a recognized research team at well-known institutions. Sometimes, the motivation to relocate only is a single personality; to work with or be close to a particularly famous scientist. In other words scientific excellence makes people move. Again, the aspect of learning and gaining new (professional) experiences is an important issue here. The following interviewee statement illustrates this:

“I was particularly interested in the person as such; the head of this research group in Sweden. He is a member of the Nobel-price committee and I thought that this could bear an enormous learning effect. [...] Additionally the institution’s name; it’s reputation played a role. I would not have moved anywhere. Working for the famous Karolinska Institute might be valuable for my future [career].” (R2)

Exploiting top-quality research conditions and infrastructure: Scientists and research professionals frequently mention that they are attracted abroad by resources such as state of the art methods, supplies and equipment as well as increased research funding. Top-quality research conditions also subsume better supervision and support for young scientists as well as a certain degree of freedom and independence in research. It is illustrated by the following interviewee statement:

“When I was at the AKH (General Hospital in Vienna) I had spent half a year on some research work with mice which I had completed within very short time as soon as I was in Canada. It is due to the fact that now I have far better mentoring and supervision as well as better methods at disposition.” (E5)

Appreciating a different working atmosphere and environment: Although it might not be a pulling motive upfront a lot of scientists and research professionals value the non-Austrian working atmosphere and environment once they have lived abroad for some time or due to previous visits. This includes issues such as flat hierarchies, relations between superior and subordinate, importance of titles, less and uncomplicated bureaucracy or structure and organization of universities. We will further deal with differences in living and working conditions between Austria and abroad in a separate paper. Two interviewees explain:

“As a young person in the U.S. one is far more accepted and recognized in the professional world. Without having my university degree yet top-scientists had listened to me and taken my opinion seriously. Somebody from Poland with a PhD will always remain a street cleaner in the view of Austrians.” (E10)

Discovering a particular city, country, or culture of interest: When scientists and research professionals relocate to places abroad they might also follow a specific interest in or personal passion for a country and its people: nature and environment as well as culture and mentality. Some enjoy living in a region with a warmer climate or like to be next to the ocean. Others are fascinated by a particular culture and life style. An interviewee says:

“The decision to go to Vancouver wasn’t due to scientific or professional reasons. I would have also chosen Vancouver over other jobs which might have been more interesting in terms of subject area. It was the city itself, which was exclusively decisive. The mountains and skiing resorts are not far away. Additionally, I wanted to change the cultural area and the mentality in Canada was appealing.” (E8)

Acquiring (English) language skills: Apart from special personal interests in a particular foreign language lot of scientists and research professionals stress the importance of improving their English language skills when moving abroad. English also is, not least, the international language in science and research, as one interviewee explains:

“I went abroad to really learn the English language. Nowadays everything is in English, even in Germany. All the technical terms and vocabulary regarding methods and know-how comes from the U.S. English simply is the professional language.” (E2)

Restraints at origin

Leaving behind family and friends: Family and private life issues are probably most crucial. The idea of leaving behind (elderly) parents, close relatives and friends makes a lot of mobile scientists and research professionals feel uncomfortable. Many underline the importance of being young, unmarried and without children or other responsibilities and keep telling themselves that “it’s not forever”. It is a challenging burden for all kinds of relationships. An interviewee says:

“There were of course personal and family barriers. I was worried about the health of my parents and I had a bad conscience leaving them alone. Emotionally that was also not very easy for my parents since I am their only child. It got really difficult after 4 years when they and I realized that it is possible that I wouldn’t return at all.” (R6)

Breaking with the familiar environment and personal roots: Closely related to family and private life issues is the personal connectedness to the proximate (social and cultural) environment. Some people are strongly integrated in their local communities as well as appreciate the structures and surroundings they are used to. Once somebody is living abroad it might cause the feeling of home-sickness. The following interviewee statement gives an example:

“For me, it was particularly challenging to cotton on to the idea of breaking away from here [home]; from living in Vienna and working at university; from founding a family and so on.” (E11)

Dropping out of the Austrian social welfare system: An important restraint especially for scientists and researchers who are planning to return is the fact that they drop out of the domestic social welfare system. They lose the entitlement for obtaining governmental benefits which does not facilitate reintegration. An interviewee describes his situation as follows:

“My period abroad had been a special case. I had been on leave of absence for the whole 3 years. The Technical University (TU) had continued to pay everything [except the salary]; employer’s and employee’s contribution. All my entitlements regarding pensions or compensation scheme were sustained. For me, that’s a very positive thing. It is possible up to 10 years but unfortunately only for people holding permanent positions.” (R4)

Restraints at destination

Dealing with immigration laws and regulations: Scientists and research professionals might flinch from relocating in light of the immigration paperwork associated with it such as visa applications for instance. Another area effected by laws and regulations is the work permit for a spouse.

“In the U.S. I would have to apply for a green card now. But for me, that’s too much work. In Europe I can work wherever I want without any problems.” (E3)

Finding a job for a spouse: Some scientists and research professionals bind the decision to move abroad to a job opportunity for their spouse. It is often not possible that both individuals of a couple find adequate positions. An interviewee explains his decision:

“The possibility to take my girlfriend to the U.S. was a precondition for staying. The job-offer was very attractive from a financial point of view but I said that I would only accept it if there is also a proper solution for my girlfriend. My boss then got her a job.” (R5)

Lacking foreign language abilities: Usually scientists and research professionals are drawn to places where they are able to get along with English, at least in the professional sphere. Nevertheless, one should not underestimate the language barrier in view of social interaction and integration. Even in English speaking countries this could be a challenge in addition to cultural differences.

“Initially I also thought of going to Spain but there was the language barrier for my girlfriend” (E9)

Being scared of the unknown: On the one hand people are looking for new experiences and excitement when going abroad. But on the other hand they might be afraid of the great uncertainty associated with relocation decisions. An interviewee comments:

“Sure there were barriers. It wasn’t easy to go alone that far away. I had a lot of doubts. In a foreign world you are strongly exposed to yourself.” (E11)

Mediating factors

Right timing and stage of life: Most scientists and research professionals underline the importance of timing when it comes to relocation decisions. The right job-offer from abroad has to come at the right point in time. It has to fit to the current professional as well as private situation, preferences and objectives. Two interviewee statements:

“I said to myself: Now or never! If I don’t go as a young, I don’t go at all. You have to move abroad in an early stage of life as long as you are alone and without responsibilities.” (E7)

“For me, the ideal point in time to go abroad is for a PostDoc. [...] The job-offer turned up at a time when my professional future in Austria wasn’t foreseeable anyway.” (R4)

Western quality of life and standard of living: Usually, when highly qualified people, such as scientists and research professionals, from Western-industrialized nations decide to relocate they want to maintain the quality and standard of life they are used to. For example, they only go to safe and secure places with quality infrastructure regarding health care or education. The following two interviewee statements provide examples:

“For me, quality of life is an essential criterion for relocating. I wouldn’t go to places with a critical crime rate or the risk of terror. That’s for sure an advantage of Sidney. I

have consciously looked at such aspects, what the environment is like, before I made a decision.” (E2)

“In Scandinavian countries there generally is a certain level of welfare state as well as a comparable social structure. That was a crucial aspect when moving to Oslo.” (E9)

Handling of application phase: The importance of a professionally handled application process should not be underestimated. Once scientists and research professionals decide to go abroad the question of where to go often remains. Sometimes they can choose between several offers. In this case an appealing and pleasant application phase might play a crucial role, as the following interviewee statement shows:

“The application phase was really uncomplicated. I immediately received response and had an extensive telephone conversation. Finally the job interview was very decisive.” (E1)

2.2.5 Returning to Austria ... or do not look back!?

Here we want to provide answers to the following questions: Do Austrian scientists and research professionals consider moving back? What are their reasons for returning?

Out of the 11 Austrian scientists and research professionals who are currently living and working abroad (expatriates) only 2 do not want to return to Austria but at the same time would not go anywhere else. The rest is either very determined to move back to Austria (2) or at least has thought of doing so (6). Basically, expatriate scientists and research professionals consider three different types of options with different underlying motivations:

Returning to Austria, not anywhere else!

Expatriate scientists and research professionals who are determined to sooner or later return to Austria are typically drawn back by private and family reasons. In this context also quality of life issues and the place itself (Vienna!) plays a role. Although there also has to be the right job opportunity they usually do not return for professional reasons. An interviewee says the following:

“After the expiration of my contract I will return to Austria. I really like Vienna. One can enjoy a high quality of life there, compared to my experiences from Madrid but also Oslo. Personally, I would be prepared to stay abroad and maybe go to the U.S. or France but I have promised to my girlfriend that we will return to Vienna. I, myself, would return anyway in order to settle down and found a family. We want to raise kids only at home. Besides, all our close friends are here. We want to stay at one place in the long run. But my girlfriend predominantly is the pivotal factor.” (E9)

Returning to Europe, at least!

A lot of Austrian scientists and research professionals are willing to return from overseas and consider at least Europe as a possible destination. They value the quality of life as well as the particular European life style and culture. Sometimes, they narrow their decision down by focusing on job-opportunities in German-speaking regions. Typically, professional aspects are of more importance to these scientists and research professionals. Below, an interviewee example is given:

“At the moment I am looking for other job-offers. But not necessarily in Austria; generally the whole German-speaking region is of interest. I like both Systems; 51% Europe – 49% U.S. I would say. Giving equivalent positions I would decide for Europe. Once European, always European! In the U.S. you really start to realize that you are European. The people, the ideas, everything is different in the U.S. There is so much that connects us here in Europe. I have yearning for Europe but do not return at any price.”
(E3)

Staying abroad, irrevocably!?

Austrian scientists and researchers might simply stay abroad because they have just very recently relocated. Some want to further expand their international work experience. Others might be forced to stay abroad due to professional reasons; e.g. the lack of (adequate) jobs in a particular scientific area in Austria. Sometimes people find their spouse abroad, marry and get children, and thus have found a new home. The following three interviewees illustrate this:

“At the moment a superior job-offer in Vienna would not be enough to make me leave Vancouver. I want to gain more overseas experience and besides, I have arrived just 4 months ago.” (E8)

“I would not know where to go in Austria; my subject area is not established in Austria. Of course there are related fields of research but there must be long-term positions available.” (E7)

“If I would return then only for private reasons; e.g. family and kids or the life style; surely not for professional reasons. The Austrian university system would have to change completely. I would not return to an Austrian post-office-alike institution without room for creativity. The only positive aspect of Austrian universities is that they are located in Austria.” (E11)

In any case a possible return or relocation is dependant on the right timing. Sooner or later people settle down and thus are becoming more and more immobile. Particularly undecided Austrian scientists and research professionals need to be approached and pulled back to Austria before it is too late. It's indicated by the following two statements; one expatriate and one returnee:

“I could also imagine staying in Los Alamos for the next 10 years. I have a permanent position now and I feel very comfortable. Additionally, my bosses really support my green-card application. Otherwise I would intensively look for a new job. I like it in the

U.S. but at the same time I don't feel very bonded. But at some point in time I want to quit the migratory life.” (E6)

“I didn't want to accept another job abroad because in the long run it is quite tiring to constantly build up a new life; new friends and social environment.” (R2)

Examining the interviews with Austrian scientists and research professionals who have moved back (returnees) confirms this point. If an individual actually returns to Austria strongly depends on self-initiative and coincidences. In only one case the support of Brainpower Austria has led to a job-opportunity and ultimately made the person return. A returnee tells:

“It was a coincidence. There was an advertisement of a professorship and I applied. I wasn't home sick. Actually I thought that I would stay there.” (R3)

Regarding returnee's motivation to move back to Austria we also find confirmation for the results from above. Apart from the job which has to be suitable and attractive to some degree returnees stress private and family issues as well as quality of life and life style. Some were home sick and were longing for their familiar environment. Others wanted to raise their kids in Europe; in a more social and secure environment. To our surprise, returnees also showed some disillusion regarding the expected top research conditions abroad. An interviewee states:

“From a scientific point of view it wasn't as excellent as I had expected. Everybody is “only cooking with water” (They are no different from anybody else!). Scientifically it was a disappointment; I was not really satisfied. Of course we published quite a lot of papers and I got to know some high-profile people. But during those 3 years I only once had a scientific discussion with my boss, although the personal relation was very good.” (R4)

2.2.6 Mobility decisions are career decisions – An attempt to identify *mobility orientation types* at the individual level

It is almost needless to say that geographical mobility² almost naturally/typically/imperatively means a change of job. Thus, the decision to relocate is inseparably linked to the professional career (not to talk about the private life!). But the reverse is not always valid; a career decision is not necessarily a mobility decision. This aspect of relocating is particularly relevant for the group of scientists and research professionals from western-industrialized countries as compared to other groups who migrate due to reasons such as political prosecution, war or famine.

In order to convey a better understanding of the motivational dynamics behind mobility decisions at the individual level we want to consolidate our results with the findings of an Austrian research team who studied the careers³ of highly qualified Austrians working in science and technology. As shown in figure 2 they developed six different *career orientation types* by clustering 74 interviewees according to Bourdieu's habitus-dimensions *behavioural motivation* (external vs. internal) and *activity pattern* (proactive vs. reactive). One has to bear in mind that such archetypes are extremely oversimplified patterns of human behaviour and actually occur only very rarely in reality. Usually, an individual exhibits a mix of different behavioural styles with a single archetype being the predominant tendency (Riesenfelder et al., 2007).

In the following we will briefly introduce each of the six *career orientation types*. In addition we show their relevance regarding mobility behaviour and decisions of scientists and research professionals by giving examples from our empirical work. The *career orientation types* are ranked according to their frequency of occurrence among professionals from natural sciences and technology.

Figure 2: Matrix of *career orientation types* according to the dimensions *behavioural motivation* and *activity pattern*

<i>Behavioural Motivation</i> <i>Activity Pattern</i>	<i>External (extrinsic)</i>	<i>Balanced</i>	<i>Internal (intrinsic)</i>
<i>Pro-active</i>	Manager	Shaper	Self-realizer
<i>Balanced</i>		Expert	
<i>Re-active</i>	Open-minded		Static

Source: Riesenfelder et al. (2007)

² Unless explicitly stated otherwise the term *mobility* always refers to geographic and/or spatial kinds of movements (as opposed to career mobility which often is strongly related to geographic mobility).

³ The term *career* is defined according to Super (1980, p. 282) as “a sequence of positions occupied by a person during the course of a lifetime”. Thus, it is less oriented towards the German meaning of the word *career* (“Karriere”) often synonymously used for hierarchical advancement and associated with income, power and influence, leadership tasks, number of subordinates etc.

1. The Expert

Experts are internally as well as externally motivated regarding their career behaviour. They long for specific knowledge and know-how; for development of their technical skills and professional competencies. These kinds of people want to be “specialists” always looking for new challenges in their particular subject matter. The openness for jobs and assignments aside from the core competencies is very limited. The expert-status and associated external acknowledgement is of utmost importance to them – regardless of a business or science context. *Experts* are highly oriented towards their profession but their goal is a technical expert-career as opposed to a leader-career in management. Thereby, they have a proactive strategy without long-term objectives. For them, the predominant purpose of (formal) networks is to exchange knowledge and get to know other skilled people. Although they exhibit a strong professional orientation the private life still is important for *Experts*. But in the case of family and children integration does not work out and they find themselves in a dilemma (Riesenfelder et al., 2007).

An *Expert* accepts an assignment abroad only if it deals exactly with his or her particular field of research. They do not go abroad for the sake of being abroad but for professional and/or technical advancement. It has to be a quality institution with high-profile people and the potential to expand the personal knowledge base in the relevant subject. Although they rather find the right project abroad themselves they also wait for a good opportunity to come. Family issues could hinder them to leave the current residence. The following two examples of interviewees predominantly match this archetype:

A 35 year old physicist working at an Austrian university (R4):

“The first job in the U.S. came about through Prof B. from Belgium who is the central character/player in the field of quantum mechanical modelling of materials. Now I have less contact to him since our interests and fields of research don’t overlap any more. [...] I was lured to the U.S. partly by the money but particularly by the highly competitive scientific environment including many “stars” and “Nobel-price-suspicious” scientists with top reputation. [...] At that time I wasn’t married and had no children. Otherwise it would not have been possible or at least a great counter-argument”

A 27 year old material scientist working at a non-university research institution in the U.S. (E7):

“Now I am sitting next door to worldwide recognized scientists and other top-people. That’s an enormous learning potential. [...] I would only return to Austria if my particular field of research is significantly better established; there have to be world-class people and a well-reputed institution with enough equipment and resources.”

2. The Self-realizer

A *Self-realizer* wants to “do his or her own thing”. They like to be able to try things out and have fun in doing so. Without being afraid they constantly search for change and something new – no matter whether in Austria or abroad. Accordingly, they are open-minded and do not become set on particular subjects or tasks and jobs. *Self-realizers* are typically internally motivated and are strongly proactive in their career planning. They do not wait until they have to react to external

conditions but actively provoke change following their current interest. Their openness regarding new priorities also shapes their private lives. The integration of professional and private spheres is very important to them and children might suddenly become more important than the job. Networks are of significant relevance to *Self-realizers* primarily for socializing but also as antennas to detect new options. The technical function of networks plays a minor role. *Self-realizers* know what they want and focus on implementing their objectives (Riesenfelder et al., 2007).

A *Self-realizer* is primarily drawn to a foreign country by following his own current interest or in the search for something new. This might be a particular institution, country or region or simply the eagerness to establish new contacts and interact with other people. The uncertainty and change associated with moving abroad does not pose a problem to *Self-realizers*. To the contrary, scientists and research professionals of this kind might easily accept a totally new field of study in addition to the relocation as long as it fits their objectives. Thus, they are geographically more flexible than others. Unless family responsibilities do not allow it they are strongly determined to leave the current residence. *Self-realizers* identify the right opportunity abroad and go for it.

A 32 year old molecular biologist working at an Australian university predominantly matches this archetype (E2):

“After I had finished my PhD I wanted to go abroad for a PostDoc at all costs. In no case I wanted to do it in Austria; so I really wanted to move to a foreign country. [...] I applied for a scholarship in order to be able to really choose where to go. Via the internet I have found the institute and my current boss. I didn’t know him before; it totally was a shot in the dark. [...] I wanted to see how other universities function, other structures and processes, in addition to the personal experiences. [...] Through a contact of my professor in Linz I also was offered a permanent contract in the U.S., without a fellowship. [...] But I didn’t want to move to the U.S., instead I decided for Australia. I like the climate and the ocean in front of the door. [...] Now my research area is completely new and with different methods.”

3. The Manager

The *Managers* are strongly externally motivated. For them, career means hierarchical advancement. Their professional goals are focused on attaining leadership positions as well as high prestige and income. Targeted and strategic career planning is particularly important for this group of “scientists and research professionals” who often get distracted from their traditional-technical tasks. This proactive career behaviour is also reflected by the strategic use of (informal) networks for achieving career objectives. The *Managers* are strongly focused on their professional careers as opposed to their private lives and strictly separate the two areas. They seldomly have kids and perceive a pressure to decide for either job or the private (family) life (Riesenfelder et al., 2007).

According to the above characterization a *Manager* is only lured to places abroad by an attractive job-offer in terms of salary, opportunities for career advancement and responsibility (research budget, team members) from a well-reputed institution. The field of work and the geographical location might be secondary to them. Family issues and private life also play only a minor role, if

at all. *Managers* excessively make use of their informal networks to get the most prestigious positions abroad. Additionally, they are eager to benefit from new international contacts to powerful and influential people.

A 41 year old microbiologist working at a biotech-company in Austria predominantly matches this archetype (R1):

“I am now head of business development and my duties are general management, sales of services but still R&D to some degree. [...] I was fascinated by the fact that each change of job was associated with more money and responsibility. I have the desire for continuous personal and professional change [advancement/development]. Exactly this is possible in the U.S. [...] In the U.S. one can rapidly advance from “bench-scientist” to CSO. Such a fast career is impossible in Austria [...] but in the U.S. the career dominates the family. [...] The contacts of Prof. K. were essential to get the job at the University of California. Via Brainpower I could identify my current job. I also had other offers, e.g. from a firm in Belgium, but they were too penny-pinching.”

4. The Open-minded

The *Open-minded* are the opposite type to the *Self-realizers*. Being open for something new, looking for what is available and trusting in the chances of life are characteristics of both groups. But the open-minded are reactive regarding new opportunities and challenges in contrast to the *Self-realizers* who are proactively searching for them. Open-minded people are externally motivated in the sense that they are driven by external conditions: Available chances are utilized! They do not need a lot of room for maneuver since they are able to adjust to the current situation. Coincidences play an important role for the *Open-minded*. They do not act strategically, for instance through proactive networking. For them, the private life is particularly more important than the professional career. They clearly subordinate job issues under family issues (Riesenfelder et al., 2007).

An *Open-minded* person is a particularly mobile type and geographically most flexible. They are open to almost every opportunity as long as it is located abroad. Usually, they are attracted by the new experience and the challenge abroad. The *Open-minded* completely rely on coincidences in getting the chance to leave the country. It might not come but if it does they are prepared to go – unless family issues and private life circumstances do prohibit them. The private life is typically prioritized and is the only true barrier to relocation for the *Open-minded*.

A 40 year old physicist working as a Senior Scientist/Post Doc at a Canadian university predominantly matches this archetype (E8):

“I have spent an Erasmus exchange semester in Spain, 7 months in Belgium for private reasons, and 4 years in Germany. [...] A friend of mine initially applied for the job in Vancouver but then could not do it and recommended me. It just perfectly fitted for me. Not least because my girlfriend is Canadian. [...] From a professional or scientific career point of view, the job in Vancouver is rather inappropriate, because it is a totally new thematic area. In the short run, I would have benefited more from staying in Jena but I am convinced that a change of research focus can pay off in the long run. I would have

preferred Vancouver over any alternative job-option. [...] Returning to Vienna always is attractive to me, since my family and friends are there in addition to all the culture and of course skiing. That sounds very simple but it's just that the private sphere is very important to me. [...] In principle, the whole area of the Alps is interesting, everything between Vienna and Nice."

5. The Shaper

The career orientation of the *Shapers* centers around doing/carrying out a meaningful work/job which is of some value to society. Their work should have an impact and be able to "change the world". They require some higher-ranking standard from their job (moral, socio-political, ecological, etc.). *Shapers* are externally (achieve a tangible impact) as well as internally (to work with good conscience) motivated and are strongly proactive in their professional approach. They exhibit a holistic-integrated and often critical view on their work, on science and technology respectively. For *Shapers*, the delineation between private and professional lives is very challenging since they strongly identify with their organization (e.g. NPO). This is also reflected by their approach to networking which focuses on the benefit for the organisation and/or subject as opposed to the personal one (Riesenfelder et al., 2007).

Shapers are attracted by the places where they can achieve the highest possible impact with their work and at the same time "do something good for mankind". They might not be afraid of relocating but once they have found their particular place *Shapers* will not easily move on. Then a *Shaper* prefers to stay because he or she has developed a deeply rooted passion for the location and the work there. In this respect they should not be regarded as very geographically mobile characters. As a result there are hardly any consequences for private life issues in the long run. The following statements are from 3 interviewees of our sample who partly exhibit character traits of this archetype:

A 40 year old molecular biologist working at an Austrian university (R3):

"I was offered a job, where I can truly have an impact. The Austrian universities are in a catastrophic condition and serious disorder. There is a tremendous need for reforms. Thus, there is a lot of room for me to correct the deficiencies and shortcomings. I try to implement structures and styles like they are common in the Anglo-Saxon area. [...] Since 2 years I am back in Austria and I strongly believe that I will also remain here for the next 5 years."

A 35 year old software engineer working at a non-university research institution in the U.S. (E10):

"After my studies I had to decide what to do. I wanted to do sophisticated science. But in the field of computer science and information technology there was nothing attractive. Austria was and is a white spot on the map regarding this subject. And I didn't want to sit somewhere and develop some "0815" accounting software (any standard software). [...] Now I have been here in the U.S. for almost 10 years. We have kids and I don't think that I will leave that place."

A 40 year old physicist working as a Senior Scientist/Post Doc at a Canadian university (E8):

“Yes, there were restraints preventing me from going abroad: the solidarity [identification] with the people; the team in Jena. I was not happy to leave Jena. I have co-established this institute; we grew from 3 to 15 people and I have put a lot of energy and effort into it.”

6. The Static (A Non-mover!?)

Static people are the personification of the desire for consistency and stability. They are satisfied with their job, status of career and general professional life. Consequently, they are rather internally motivated in the sense that the own non-change (invariance) becomes the objective. As long as the situation does not demand a reaction the *Static* do not plan to undertake anything. Since their goal is continuity they perceive the requirement to change as pressure to adjust. Regarding the reactive basic attitude they are comparable to the *Open-minded*. Private life is very important and family issues receive more attention than the job, if necessary (Riesenfelder et al., 2007).

The *Static* are the immobile type of people. They typically do not go abroad. If a static person decides to leave his or her country anyway then only in exchange of long-term perspectives (e.g. permanent job/position) or due to some other true dissatisfaction (e.g. family situation). But they would never initiate the relocation themselves. The *Static* really depend on other people or circumstances to push them abroad.

A 40 year old Spatial Planner/Economist/Geographer working at a state-owned non-university research institution in Austria predominantly matches this archetype (R6):

“I have never been abroad for either professional or educational purposes before. My relocation to the U.S. actually was my one and only, although quite long in duration (11 years). [...] Prof. M. invited me to the U.S., and once I was there, another professor convinced me of doing my PhD in Chapel Hill. [...] Nothing really prevented me from leaving Austria. There was no real future perspective; hardly any [institutional-]support and [job-]security. I could not exist easefully in Austria. [...] Basically, it was the guaranteed and permanent job, which made me move to the U.S. [...] Then I married in the U.S. and we built a house. My job at a small private research institute was good; I felt comfortable and it was likely that we stay there. [...] But when the kids came work-life-balance was not possible any more and we decided to return to Austria. [...] The idea of relocation was strongly provoked by my wife.”

3 Summary and Conclusions

In this paper we have discussed the importance of knowledge for regional growth and development and highlighted the key role of highly qualified talent, particularly from science and research, as carriers of this knowledge. Through spatial movements of these individuals their embodied knowledge is transferred across national and geographical borders. Thus, it is crucial to develop an understanding of their mobility decisions. Consequently, we focused on finding answers to the following research question: “*What are the characteristics, motivational dynamics and location factors behind mobility decisions of (Austrian) scientists and research professionals?*”

In summary we have found that previous mobility activity (mobility background) influences future decisions of scientists and research professionals through developing institutional and local familiarity, gaining general international experience and discovering regional and cultural affinity. Scientists and research professionals get their jobs abroad either via personal networking (reactively) or through applying for scholarships based on self-initiative (proactively). At the aggregate level the reasons which are pushing scientists and researchers abroad are the influence of friends and colleagues, better career prospects, and lack of job opportunities at home. On the other hand there are motives pulling Austrian scientists and researchers abroad such as (unique) job-offers, increased salary, adventurousness, scientific excellence, superior research and working conditions, particularly interesting countries and cultures as well as improving language skills. Restraints at the place of origin center on private and family issues and cutting with the accustomed environment. At the same time there are also restraints at the destination including immigration regulations, job for a spouse or uncertainty. Additionally the decision to relocate is mediated by the right timing and stage of life, Western standards regarding quality of life, and a pleasant application process. We have also tried to consider motivational dynamics and behaviours of Austrian scientists and research professionals regarding mobility decisions at the individual level. Since mobility decisions are always career decisions we have made an attempt to cluster mobility orientation types analogously to career orientation types, as identified by Riesenfelder’s team (Riesenfelder et al., 2007). An *Expert* is primarily drawn abroad by learning potential and scientific excellence, whereas a *Manager* is primarily attracted by monetary incentives or career advancement and acts highly strategically. Both types have no particular internal motivation. The *Self-realizer* and the *Open-minded* represent opposites. An *Open-minded* is a very mobile person. This mobility orientation (arche-)type is driven abroad by the desire for adventurousness and change but depends on coincidences to get an opportunity. In contrast there is the *Self-realizer* who also is attracted by new experiences but actively follows his current interest; e.g. a particular institution or country. The *Shaper* and the *Static* are rather immobile characters. Once a *Shaper* has found the place and work where he can achieve substantial impacts he develops a strong identification and might not move on. The *Static* are stable and a bit afraid of change. They only leave their country of residence due to severe external pressures.

In conclusion we want to point out that the factors altering location decisions are highly fragmented and multifaceted in nature. As a result the decision making process is characterized by an extremely complex interplay of various motives for and obstacles to mobility. Very often moving abroad is a matter of coincidences rather than the result of rationally or strategically planned decisions. A particular window of opportunity at the right stage of life or point in time

strongly influences the “decision” for a location. Emotions and intuition seem to play a significant role in accepting a particular offer. Such windows of opportunity particularly emerge through informal networks. Therefore it is the task of policy agents to implement measures which promote (informal) networking and allow professionalizing (formalize) the mediation process between windows of opportunities and potential candidates. Contrary to expectations there is a considerable potential for return migration of scientists and research professionals. The actual return of an individual primarily depends on private and family conditions.

The results of this study will serve as a basis for preparing a questionnaire which will be used to more thoroughly investigate the factors shaping mobility decisions of scientists and research professionals around the globe.

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