

# Smart move?

The spatial mobility of high educated graduates  
in Arnhem Nijmegen City Region



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### Colophon

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The spatial mobility of high educated graduates in Arnhem Nijmegen City Region

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## Prologue

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With appropriate pride I present you the result of my master research which I conducted for Arnhem Nijmegen City Region. This research marks the end of my master Human Geography at the Radboud University. My personal interests in regional development, quality of living and regional positioning do form a solid basis for the fulfillment of this research. To conduct this research within the regional government of Arnhem Nijmegen City Region has been a real pleasure to me. Colleagues were truly involved with my research and gave me solid support. In particular I would like to thank Jolanda van Rensch for being such an easy and pleasant supervisor to me. Several times she gave me substantive feedback on my work and she involved me in several secondary activities within the organization. In this way I gained my first experiences outside the walls of the university. Thereby, I would like to thank other colleagues at Arnhem Nijmegen City Region who have been helpful to me.

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Doing this research has learned me to grow in being assertive, independent, accurate, structured and disciplined. Therefore, I am convinced this has helped me prepare myself to the next phase in my career. I cannot wait to enter the labor market and to support an inspiring team in conducting geographical research and advises in the field of urban and regional development. Who knows I am one of that highly skilled people who chooses to work and live in Arnhem Nijmegen City Region?

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# 1| Introduction

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## 1.1| Problem indication

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For years the relation between human capital and regional economic growth has been a trending topic in the scientific literature. This is primarily because advanced societies have evolved towards what has been called a 'knowledge-based economy', in which human capital is considered to be a crucial feature of economic growth. In a knowledge economy, the most competitive regions are typically those with high levels of human capital, whereas the regions with low levels of human capital experience stagnation or slowing growth (Haapanen and Tervo, 2012). The presence or absence of knowledge is one of the explanations of regional differences in economic standards (Safdari et al., 2010). In this view, only higher education and skills are perceived as being sufficient for countries to compete in the globalized knowledge sectors (Faggian & McCann, 2009a). Well-endowed regions are characterized by higher rates of productivity and, through their greater ability to innovate and adapt, tend to be more resilient to economic downturns. Thereby, they are better equipped to meet the challenges of industrial restructuring (Champion, 2012). Hence, human capital is an important ingredient in the economic prosperity of regions and cities.

The interest in learning regions has not been confined to academia alone. Many regions throughout the European Union, for example, are working on the development of regional innovation strategies in an effort to further develop learning processes in regions (Boekema et al., 2000). In the context of the European Union these regional innovation strategies are often called 'smart specialization strategies'. Individuals, governments and international organizations have become increasingly aware of the importance of higher education to the performance of the economy. Globalization of competition causes in the last 20 years a rapid increase in the demand for higher education. In response to this development, many countries and regions invest resources, time and effort to develop their population's higher level skills and knowledge. In the traditional literature the relationship between human capital and regional development researchers emphasize the role of the local universities' multiplier effects. Universities are indeed beneficial to local economies in terms of local income and employment multiplier effects. However, in a globalizing world regions are increasingly open for labor flows and people are becoming increasingly geographically mobile in response to technological change and globalization. Faggian and McCann (2009b) distinguish two sets of human capital effects on regions. One effect is associated with location-specific local knowledge spillovers and human capital externalities. The second effect is inward labor migration. In cases in which these two impacts coincide, regions will flourish, whereas in situations where they do not coincide, regions will struggle (Faggian and McCann, 2009b).

Because of the advantages of human capital, many regional policy makers are very interested in the choice of residence of this group of highly educated people. Several studies indicate that university graduates are spatially very mobile (Venhorst et al., 2010; Venhorst et al., 2011b; Faggian & McCann, 2008; Haapanen and Tervo, 2011; Sjaastad, 1992). For this reason it is a challenge for regional policy makers to keep highly educated graduates in the region where they studied. Both universities and universities of applied sciences (Hogescholen) play a key role in the attraction of knowledge to the region (Venhorst et al., 2011). Universities play a role in bringing the human capital into regions. Regions with a university have a continuous flow of new tertiary-educated human capital and, thus, an advantage over other regions. It is unclear how well regions with universities succeed in maintaining this new human capital; do the graduates stay and for how long (Haapanen and Tervo, 2012)? For this reason, it is for city officials a very interesting and relevant question how to bind these people to their city.

Young people who decide to study in a university or a university of applied sciences, tend to cluster together. This is not really surprising, since the knowledge institutions where they study are spatially clustered too. After graduation, higher educated graduates tend to cluster as well. Many decide to stay in the city they studied in, but a certain part leaves the region. Many

cities and regions are anxious for higher educated to leave (Dijk & Venhorst, in Platform 31). In several studies it has been found that highly educated people in peripheral regions are tend to move to core regions. Many peripheral regions experience the problem of *brain drain* (Haapanen & Tervo, 2011). The outward-migration and brain drain, is much higher among graduates in the more peripherally located universities than in the growth centers. In this respect the question of how to keep highly educated graduates in the region is especially a relevant topic for the more peripheral regions. In a smaller university region, however, a graduate may develop location-specific human capital and stay in the area (Haapanen & Tervo, 2012).

Connection with the region can be an important factor which explains the choice of residence of graduates. This connection may exist with the region someone grew up in, but could also develop with the city in which someone studied. The emotional attachment someone has with a region is reflected in the term *sense of place* (Hospers, Verheul and Boekema, 2011). After graduation, other factors start to play a role too. For instance, chances on the labor market and finding a good regional environment to live which fits in the new phase in the graduates' lives (Dijk & Venhorst, in Platform 31). This vision fits in Fielding's (1992) theory, which introduces the concept of an 'escalator region'. In his research social mobility in South-East England was researched. Many other academics used his concept to show that young people with high potential move to central regions. During their stay in these regions, they climb the social ladder. At the end of the escalator the people graduate, get a job and often start a family. In many cases, they leave the region to start a family life in a more peripheral region. In this case the escalator region loses a major part of its graduates and mostly plays a role in the process of 'social climbing'. According to Fielding, the escalator region is attractive to young people who want to develop themselves, but less attractive for people who already passed this phase (Fielding, 1992).

Venhorst and colleagues (2010) found evidence that there are substantial net flows of human capital, mainly toward the economic center of the Netherlands, which clearly is the urbanized Randstad area (Venhorst et al., 2010). However, outside this core several other urbanized areas exist, like the Arnhem Nijmegen City Region. Arnhem Nijmegen City Region is an urbanized region located in the east of the Netherlands in the province of Gelderland. The region is an extension of the local government and is very much focused at solving regional issues in an urbanized area, with a primary focus on mobility, living, working and spatial policy. The city region's central objective is to create, on behalf of the twenty participating municipalities, an attractive, accessible and an international competitive region for citizens, companies and visitors (De Stadsregio, 2014). Because the city region is located outside the country's core area, it could be possible that the region is prone to brain drain effects. It is hereby the question in what extent the region functions as a 'escalator region' (Fielding, 1992) in which students educate themselves to climb the social ladder and leave the region after graduation to find a job or to start a family. Can Arnhem Nijmegen City Region be considered as an escalator region itself, or does the region attract people who 'hopped off' the escalator elsewhere? This question will be answered in this thesis by researching what the motives are which determine the graduates' choice of residence. Thereby it is the question if there is any reason to be concerned about brain drain effects in Arnhem Nijmegen City Region and therefore to be concerned about the region's competitive advantages compared to other regions in the Netherlands.

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## 1.2| *Scientific and societal relevance*

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To find out what graduates' motives are to stay or leave Arnhem Nijmegen City Region after graduation is both relevant for societal and scientific reasons. In the existing scientific literature, many authors used the concept of an escalator region (Fielding, 1992). In scientific sense, this thesis will re-introduce Fielding's (1992) theory about the escalator region as an angle to investigate mobility flows of higher educated graduates. However, it is questionable if this theory, which is already more than twenty years old, is still applicable. Furthermore, this theory is developed in South-East England, which clearly has different regional characteristics

compared to a Dutch urban area as Arnhem Nijmegen City Region. This research aims to investigate which factors play a role in the choice of residence of higher educated people who studied in Arnhem Nijmegen City Region. Do these findings fit in Fielding's theory? In this respect this thesis aims to find more evidence for Fielding's theory or contribute new elements to it, or to reject this theory.

According to Venhorst et al. (2011a), who did research on migration flows of graduates in the Netherlands, policy makers are very concerned about the outflow of higher educated people in certain cities or regions after graduation. These graduates are of major importance for the development of cities, a higher labor-productivity and for enough support for certain facilities (Venhorst et al., 2011b). Human capital could be considered as one of the key factors in understanding and supporting regional economic performance. Especially in times of demographic changes and growing demand for highly-qualified graduates, it is of high importance to understand how many and which graduates remain living in the region surrounding their university after graduation (Jaeger and Kreutzer, 2012). Areas outside the Randstad area, 'intermediary regions' or more peripheral regions, generally have to deal with the departure of young, educated people. Many of these people move to regions with better labor opportunities (Van Ham & Hooimeijer, 2008). Young, higher educated people are very mobile (Venhorst et al., 2011b). They invested in their education and want to find a fitting job (Venhorst et al., 2011b). According to Venhorst et al. (2010) many university cities do not have enough jobs for everyone, which is why many graduates are forced to leave the region. This research is socially relevant, since it can inform the policy makers of Arnhem Nijmegen City Region, the province of Gelderland and the twenty participating municipalities about the factors which determine the graduates' choices of residence after graduation. The research aims to reveal chances for the region which can be utilized to keep higher educated within the region. In which ways should the city region implement policies to create an attractive climate of settlement for higher educated?

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### *1.3/ Problem statement & research questions*

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The objective of this research is to further develop Fielding's theory of escalator regions by applying it on the Dutch urban region Arnhem Nijmegen. Can this region be characterized as an escalator region? And which kind of people use this region to educate themselves and subsequently leave or stay in the region? First it is an important to find out whether or not brain drain is actually happening in Arnhem Nijmegen City Region. It will be analyzed how many students leave the region after their graduation, in which radius they tend to migrate and how many of the graduates continuously reside in the university region. Furthermore, this research wishes to make clear what motives graduates have to leave or to stay in the Arnhem Nijmegen City Region. Combined with information about the students' geographical origin, migration patterns are derived and compared. This thesis aims to give insights into the motives influencing the decision of graduates to stay in the region or migrate to another. Another question which will be addressed is: what personal and regional characteristics influence migration decisions? Does, for example, the probability to migrate of a certain type of graduate (the field of study) vary from the average? Or does the process of job application influence the probability to migrate?

Furthermore, this research aims to give recommendations to improve the local policy to create an attractive climate for settlement for graduates. Hereby, weak characteristics of the region (which are reasons for highly educated to leave the region) should get strengthened and strengths (which are reasons for highly educated to stay in the region) should get strengthened even more to give the region a clear profile. However, it is the question to what extent policy can influence the graduates' flows by changing the regional characteristics. In the context of the 'smart specialization' concept, which is European policy to encourage regions to define and invest in their strengths, this thesis focuses on the graduates who studied in the field of the region's four top sectors: Health & Technology, Energy & Environmental technologies, Fashion & Design and Logistics. For this reason, the following question will be answered in this thesis:

## Which factors determined the graduates' choice to stay or to leave Arnhem Nijmegen City Region after graduation and in which extend do knowledge institutions, businesses and government cooperate in the region to keep knowledge in the region?

To answer this main question, it is necessary to answer some sub questions first. Important sub questions are:

- 1. What is the current situation in Arnhem Nijmegen City Region: in what extent do higher educated stay or leave the region after graduation?*
- 2. What characteristics do graduates who leave or stay in Arnhem Nijmegen City Region after graduation have?*
- 3. What motives do graduates have to leave or to stay in Arnhem Nijmegen City Region after graduation?*
- 4. In what way are education and labor market in Arnhem Nijmegen City Region connected with each other and in what extend do different parties within the triple helix cooperate with each other within the field of knowledge sharing?*

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### *1.4/ Research method in brief*

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To answer the main research question in this thesis, quantitative and qualitative research methods will be used. The quantitative data will be used to test the hypotheses which are distilled out of the theory. These data will be collected among graduates of the region's only research university: the Radboud University Nijmegen. The data of these graduates should make clear what the migration patterns of the graduates are and what motives underlie these migration patterns. In a survey information about location of residence, location of work, the appreciation of the working and living environment etc. will be gathered.

In the qualitative part in this research some key persons within the regional businesses, knowledge institutions and governments will be interviewed to get an understanding of knowledge exchange in the region. Thereby, this part should make clear in which way the local government can provide the right circumstances for regional knowledge exchange to happen.

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### *1.5/ Thesis outline*

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This thesis is built up in seven main chapters. In chapter 2 relevant theories will be discussed which will form a base for the research. Theories and concepts about human capital, brain drain and spatial behavior are put forward in this chapter. In chapter 3 the regional (economic) characteristics of Arnhem Nijmegen City Region will be explained. In this chapter it will become clear which top sectors are settled in the city region and therefore, make the region competitive. At the end of this chapter there will be a conceptual model from which hypotheses can be drafted. Chapter 4 will explain which methods are used in this research and will clarify how certain concepts are operationalized. In chapter 5 the results of the quantitative research will be presented. The hypotheses will be tested in this chapter. The chapter thereafter will discuss the outcomes of the qualitative part of this research. Finally, the research will finish with concluding remarks and recommendations in chapter 7. In this chapter the central question of this research will be answered.



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## 2| Migration behavior of higher educated: a theoretical framework

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### 2.1| Introduction

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To answer the main question of this research, the topic should be put into a theoretical framework first. This chapter offers this framework, by discussing several theories about the spatial mobility behavior of highly educated people. First, however, the importance of knowledge in modern societies will be discussed. Thereby, a sufficient cooperation within the 'triple helix' is of major importance when it comes to the strengthening of a regional knowledge economy. The importance of this regional cooperation between government, entrepreneurs and knowledge institutions will be discussed in paragraph 2.2.1. In the next paragraph, the central concept of this thesis will be further explained: Fielding's concept of the escalator region. More recent studies show that the concept of the escalator region is more complex than Fielding in 1992 presented it. Because of the concept's limitations, this research will take further theories about migration and spatial mobility into account to enrich Fielding's concept. This will be done in paragraph four. The last paragraph of this theoretical framework will link the theory with the case study in this research, by visualizing the spatial flows of highly educated graduates within the Netherlands. This paragraph is based on the research of Venhorst (2012) who did research on spatial behavior of Dutch graduates. First, however, this chapter starts with the very basic concept of this research, namely with the concept of the *learning region*.

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### 2.2 The learning region

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In the contemporary knowledge-based economy, the term *learning region* became a central concept. However, there is no simple definition for this term. This issue is too complex to be captured in one phrase. Boekema et al. (2000) define the learning region as "the physical expression of the understanding which has grown, particularly during the last 25 years, that economic growth is dependent on innovation, and innovation, in turn, is dependent on the creation, dissemination and application of knowledge". Learning processes are usually connected with space, which is why the term 'learning region' is developed. The focus on learning is rooted in the conviction that the nature of the economy has shifted from a labor and capital-based economy to a knowledge-based one, where knowledge is the most important resource and learning the most important process (Boekema et al., 2000). Making use of knowledge or making use of old knowledge in new ways, contributes to innovations which lead to economic development.

In a globalizing world economy many competitive advantages have been eroded because the knowledge and technologies on which they were based are now available on a global scale and successful practices of firms have been copied elsewhere (Boekema et al., 2000). Porter (1990) distinguishes higher-order and lower-order competitive advantages. Lower-order advantage, for example, labor costs, availability of raw materials etcetera, are easy for competitors to imitate or to duplicate. Particularly in an international economy where transport costs are negligible and markets are increasingly global. Higher-order advantages, such as proprietary process technology, product differentiation based on unique products or services are more durable. These advantages need more effort to create. In this respect, human skills and knowledge now make the difference. "The prospects for creating firm-specific competences become even better when we realize that personal skills, knowledge, organizational routines, and practices belong to the realm of what has become known as tacit knowledge" (Boekema et al., 2000). In contrast to codified knowledge, which can be easily transferred on a global scale -for example through the use of the internet- tacit knowledge requires a lot of intensive face-to-face communication to transfer not only the content, but also the context of the knowledge. Proximity, thus, plays a major role in this process, which makes the local scale very important when it comes to knowledge circulation. Tacit knowledge means that it cannot easily be disseminated to, or copied by, other firms. "In short, tacit knowledge embedded in an

organizational context is the key to competitiveness in the knowledge-based economy (Boekema et al., 2000). The regional economies of learning regions are often based on specific sectors. Therefore, it is important to apply the correct policy with regard to economic clusters to strengthen the regional competitive advantages.

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### *2.2.1 Clusters*

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Clusters are often places of innovation. Porter is one of the founders of the cluster theory. In his work 'The Competitive Advantage of Nations' (1990) he emphasizes the importance of concentrations of industries and competition with similar kind of companies for the economic growth on regional scale. Porter argues that economies do not compete on national, but on regional scale. The core thought of his theory is that different companies compete with each other on a market whereby the performance of individual companies in certain industries determine the region's competitive advantages. Just as companies, countries and regions compete on an (inter)national scale. Porter describes a cluster as a group of geographical proximate companies and related institutions, which are related by common and additional elements within a specific domain. Porter argues that cooperation within a heterogeneous group of organizations in a cluster leads to the composition of visions and signaling bottlenecks and chances (Porter, 1990). Clusters, however, are not the only condition to achieve a competitive region. Nonetheless, in the framework of this research this condition is very important and therefore the only one discussed in this theoretical framework.

After defining clusters, it is important to explain how clusters are implemented in policy. Rosenfeld (2002) did a study about cluster policy. In this study, Rosenfeld distinguishes three kinds of regions which fail in retaining and attracting highly educated talent. First he distinguishes old industrial areas which are very labor-intensive. Secondly, semi-industrialized areas with lots of small companies and third, peripheral, less populated regions with a leaving young population (Rosenfeld, 2002). The more successful regions are often, to a greater or lesser extent, specialized in an activity they do best or an activity wherein they have a competitive advantage (Porter, 1990). Because of geographical circumstances, by accident or because of a political set course, certain activities are concentrated. According to Rosenfeld (2002) a region cannot be successful in different activities, but are mostly successful within one activity. Therefore, many regions focus on their strengths, distinctive characteristics and concentrations and innovative capacities within certain industries and clusters wherein they score above the national average norm. Clustering of specialized activities offers companies a more exclusive access to clients, specialized services, suppliers, potential partners and networks, employees and knowledge. These factors make clusters an attractive area for related companies and institutions (Rosenfeld, 2002). Successful clusters are able to achieve innovation, to commercialize knowledge, create markets, stimulate entrepreneurialism and retain and attract talent. Innovation and imitation are often the spearheads of clusters (Rosenfeld, 2002). Imitation causes new products and innovations to be spread, used and improved (Boschma et al., 2002). It should be mentioned, however, that a specific clustering of activities can make regions venerable too, since specialization can lead to dependency as well.

Many regions fail in creating a successful cluster. One of the reasons Rosenfeld puts forward is the peripheral location of regions. These regions lose their young, talented workers because other regions can offer the graduates more. Graduates often move to 'cool places' (Rosenfeld, 2002), because there are more jobs, culture and diversity in these regions. The more peripheral regions often have a lacking infrastructure and access to capital. Studies are often offered, but these are according to Rosenfeld (2002) rarely focused on 'forward-looking' economic development. Therefore, it is important to know in what extent knowledge is rooted in the region. Paragraph 2.4 will further address this topic by discussing the most important theories regarding spatial behavior of higher educated talent. First, however, a final aspect regarding the learning region will be discussed, namely cooperation within the triple helix model. To make a learning region flourish, it is necessary for firms to cooperate with other parties in the region as knowledge institutions and governments.

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### 2.2.2 Cooperation within the triple helix

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To create a learning region, it is necessary to take the triple helix model into account. Within a triple helix model local governments, entrepreneurs and knowledge institutions closely cooperate. Delfmann et al. (2009) refer to this theory in their study on the role of higher education in the regional knowledge circulation. In the triple helix theory every organization knows its own traditional role, but at the same time these organizations are able to play the role of another party. Knowledge institutions, for example, can play the role of an entrepreneur to act in a more commercial way and vice versa. According to Etzkowitz and Leydesdorff (2000) this is the way in which innovation can occur. These authors formulate three forms of cooperation between government, entrepreneurs and knowledge institutions. The first form is the 'statist model', whereby the government manages all the relationships between the three groups. In this model the government plays the dominant role which causes there is not much space for entrepreneurs and knowledge institutions. Hereby, the chances for innovation and bottom-up developments to occur are small. The second form of cooperation is the 'laissez-faire model', in which the three organizations operate and function independent. The contact among the three organizations is in this model very limited. The last model is the 'triple-helix model' in which there is a lot of interaction and the three organizations are to some extent intertwined. This triple-helix model is applied by various national and regional governments to stimulate the knowledge circulation among other types of organizations (Etzkowitz and Leydesdorff, 2000).

According to Getler (2005) too, interactions in a cluster between different kinds of organizations are important. The most important participants in a cluster are companies, knowledge institutions, production companies and specialized research departments (for example the ones at governments). For companies in a cluster the proximity of knowledge institutions is of major importance for knowledge circulation (Getler, 2005). Knowledge flows more easily among the different parties via 'tacit knowledge' and personal contact. Transfers of knowledge happens, according to Getler (2005), when high graduates 'flow' towards the entrepreneurs. In this case, graduates apply their recently acquired knowledge in local businesses. Getler argues that mainly companies which apply scientific knowledge have interest in cooperation with universities and other knowledge institutions. According to Getler the presence of higher educated workers is a major input for clusters. Whether highly educated come to and stay in the region depends on the quality of the regional knowledge institutions. Whether highly educated stay in the region after graduation depends, inter alia, on the quality of living in the region. Therefore, a good cooperation among the three organizations within the triple-helix is of major importance for a flourishing regional knowledge economy (Getler, 2005).

After discussing the basic *learning region* concept, the following paragraph will discuss the central theory of this research which elaborates on the learning region concept: Fielding's escalator region. This theory is more focused on creating a theoretical framework for answering the central question of this research.

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### 2.3| Fielding's escalator region

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Fielding (1992) introduced the term 'escalator region' when he did research on the spatial mobility of people in South East England. This theory is mainly based on the specific life-stage of an individual. Young people move to the city to educate themselves and to build up a career. They migrate to the city to study and to find their first jobs. Core regions are able to attract human capital. According to Fielding (1992) people 'use' differences between regions to improve their position on the social ladder. After graduation many people find a job and their incomes increase. In some cases, they start a family. Later on in their lives, they 'hop-off' the escalator to live, for example, in a quiet, green and peripheral area. In this case, there is a chance a higher educated leaves the region of education. There are three stages or conditions in the escalator region hypothesis: (1) Escalator regions attract many young people with promotion potential at

the start of their working lives – “stepping on the escalator”; (2) Escalator regions provide the context where these in-migrants achieve accelerated upward social mobility – “being taken up by the escalator”; (3) Escalator regions lose through out-migration a significant proportion of those gaining from this upward social mobility – “stepping off the escalator” (Champion, 2012). In this respect an escalator region is appealing for young people who wants to educate and develop themselves and to start a career. However, escalator regions are less appealing for those who are further on in their (social) career. Fielding concludes the South East region of England acts as a kind of ‘upward social class escalator’ within the British urban and regional system (Fielding, 1992). Several other studies have largely reinforced this finding (Fielding, 2007; Findlay et al., 2009; Champion, 2012; Gordon, 2012).

Fielding focusses, however, very much on one dominant national escalator region: London. His analyses masks the existence of second-order cities with higher than average rates of upward social mobility. According to Champion et al. (2014) there are second-order cities that rival London as places where people progress their careers more rapidly than the norm and thereby attract in-migration. Examples of these second-order cities are Birmingham, Manchester, Leeds, Newcastle, Bristol, Sheffield, Liverpool, Nottingham, and Leicester. In this respect, places can be considered to act as escalators which operate at different speeds. However, second-order cities cannot rely on the speculative migration of talented people but need suitable jobs ready for them to access (Champion et al., 2014).

As mentioned in the introduction, Fielding’s theory has its shortcomings, since it tends to simplify a very complex network of mobility flows. Therefore, several nuances are worth giving attention. Venhorst et al. (2010) for example, ascertained that university students are more spatially mobile than students of applied sciences. Faggian & McCann (2008) also concluded that English students are spatially very mobile, both between place of origin to university and from university to the region of the first job. According to Sjaastad (1992) too, academic graduates are spatially more mobile than lower educated people. Higher educated change jobs more often than lower educated, which makes it more likely for higher educated to move more often when they found a new job. However, Hensen et al. (2009) conclude in their research that both lower and higher educated graduates are spatially flexible in their search for a fulltime job. Thereby, students who have already moved before in the past, are tend to do this more often in the future than students who did not change the place of residence before (Faggian & McCann, 2008). Because of these many findings and conclusions it is hard to model the migration flows of graduates. However, Fielding’s attempt to do this has been valuable and provides an interesting view on migration flows of higher educated people. The next paragraph will further complement his theory by discussing several determining factors of post-graduation mobility.

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#### *2.4/ Migration behavior of human capital*

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This paragraph will discuss further theories about spatial behavior of higher educated people, since Fielding’s escalator region theory is not specific enough to use as a complete theoretical framework for this research. Sjaastad (1962) has been one of the first authors who connects migration behavior with human capital. According to Sjaastad migration should be seen as a choice to invest in human capital. His model about the choice to migrate consists of a consideration of costs and benefits. Someone moves when benefits are higher elsewhere. Sjaastad’s approach is based on the maximizing of benefits. In this respect benefits are not just loans, but benefits in its widest sense. Movements do not necessarily happen between low wage areas and high wage areas, since many social and economic reasons and environmental conditions play a role too. The costs in Sjaastad’s model are not necessarily economic either. For example, the psychological effects of leaving a familiar area also count as costs (Boyle et al., 1998). Sjaastad’s work can be considered as one of the basic theories for further, more recent researchers about post-graduation mobility.

In some contexts, human capital may be very mobile. It is therefore important to consider inter-regional flows of human capital. Faggian and McCann (2009b) estimate the local/non-local patterns of these flows. Their findings suggest that university attendance in

Great Britain is generally associated with very significant levels of human capital mobility. Only certain types of higher education institutions play a significant employment role in their local economies. For regions it is very important to understand the motives and reasons behind the relatively high mobility of human capital (Huis and Agtmaal-Wobma, 2009). Therefore, central points in this paragraph are the characteristics which according to the literature play an important role in the migration behavior of higher educated: personal and household characteristics, educational characteristics, career characteristics and regional characteristics.

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#### 2.4.1/ Personal and household characteristics

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First, Fielding's theory will be enriched with theories regarding migration behavior and personal and household characteristics. According to (inter alia) Faggian et al.(2007) the decision whether to move or not has to do with chances and limitations on the level of the individual or the household. After all, it is the individual or household level in which the decision to move is made. In this paragraph the relation between individual and household characteristics and migration will be discussed.

A major part of migration behavior literature relates to the stage in the family life-cycle. Rossi (1955) was one of the first to make such a link in 'Why families move'. Rossi argues that mobility arose for five reasons, namely the creation of new households, mortality, household dissolution, and moves related to work. The first four reasons are clearly linked to the stage in the family life-cycle. Rossi's outcomes suggest that about one-quarter of all residential mobility is forced (driven by eviction, demolition, work, marriage, divorce or downward social mobility). In 75% of the cases in his research households move on a voluntary base in a continuous process of matching their accommodation to their changing housing needs (Boyle et al., 1998). Another theory about migration behavior is developed by Wolpert (1966). He introduces the notion of stress tolerance. This model assumes an individual to tolerate a certain amount of discomfort or stress on his place of residence. When this individual reaches his stress threshold, he or she can decide to lift this threshold or can decide to leave the current place of residence. In this model, stress is caused by changes in the composition of households, characteristics of the current house or environment or by a lowering threshold caused by rising ambitions (Wolpert, 1966).

On the individual level, the gender of an individual plays a role in the explanation of migration behavior. According to Faggian et al. (2007) and Venhorst (2012a) men are spatially less mobile than women. Women tend to use movements to get access to more and better jobs, partly to compensate the gender differences which exist on the labor market (Faggian et al., 2007). Within many disciplines in social sciences it is shown women are systematically discriminated on the labor market (Blundell et al., 2000; Lissenburgh, 2000; Anderson et al., 2001; Grimshaw & Rubery, 2001). An understandable response to this is for women to search in a bigger geographical area to find a fitting job (Faggian et al., 2007). The chance for women to leave the region or city they studied could be bigger because of this. Also Van Ham et al. (2001) show that spatial flexibility leads to better labor market opportunities, but that not all people are equally tent to be spatially mobile. They find that there are differences between genders. According to van Ham (2002) women are often confronted with time-space limitations. Generally, women have a shorter commuting distance than men, because they have every day obligations as children and the household (van Ham and Hooimeijer, 2008).

The length of time after graduation also influences the individuals' migration behavior. In this respect, Haapanen and Tervo (2012) use in their longitudinal studies two concepts: on the one hand *cumulative inertia* and on the other *cumulative stress*. Cumulative inertia means that the propensity to move decreases as the period of stay lengthens. By developing location specific human capital the propensity to move decreases. After all, people's bond with their environment (their homes, houses, friends and region) develops in time. Cumulative stress, on the other hand, means that migration is more likely to happen when graduation is near. This is because the student starts to look for a fitting job in a broader geographical area. Cumulative stress means that stress increases when individuals are starting to be unsatisfied with their current living

situation, possibly caused by the progress in the life-cycle or career. The researchers conclude that on the moment of graduation cumulative stress dominates the cumulative inertia. Venhorst (2012b) concludes that graduates' mobility decreases when graduation is further in the past. Haapanen and Tervo (2011) did a longitudinal research on the spatial mobility of academic graduates in Finland between 1991 and 2003. They concluded that two years before graduation and during graduation the probability for migration to happen is bigger than after graduation. Haapanen and Tervo (2011) find highly educated a very spatially mobile group, but most of them do not leave their region of education. However, the migration of higher educated from peripheral regions is bigger than in the core regions. In the research of Haapanen and Tervo (2011) Helsinki is the core region in which higher educated are tend to stay. For students who live in the city where they study the chance they move is smaller than for students who commute between their home region and their city they study.

The graduates' regional origin influences the mobility behavior of individuals too. Jaeger and Kreutzer (2012) conclude that graduates who are originally from the Central Lower-Rhine region, where the university is situated as well, are more tend to stay in the area than others. Venhorst (2012b) also suggests that familiarity with the region affects the direction of migration. Many graduates stay in the city or region they studied or they return to their region of origin.

To understand the migration behavior of graduates it is important to take the characteristics of their households into account. First the size of the household matters, since one man households do not have to take someone else's wishes into account (van Wee, 1994). Also according to Carree and Kronenberg (2012) it is less likely for households with more than one person to move. Other members of the household can refuse to move because of various reasons. A movement can mean that someone else in the household has to give up his or her job, friends and familiar environment.

Finally, according to Haapanen and Tervo (2007) characteristics of the graduates' partner plays a role in the explanation of mobility behavior too. If the graduates' partner has a job, it is less likely for the household to move than the case in which the graduates' partner is unemployed. This is explained by the personal unemployment, which causes individuals to search for a job in a broader geographical area. This often goes hand in hand with moving (Jaeger and Kreutzer, 2012). Thereby is the personal bond with the local labor market lower if the person in case is unemployed (Haapanen and Tervo, 2007). The probability for the graduate to move also decreases when the partner's income increases. The higher the partner's income, the less stimuli there are to move, because it is less necessary to move elsewhere to earn more money (Haapanen and Tervo, 2007).

On the individual and household scale, several characteristics influence the migration behavior of people. Life stage, gender, the length of time after graduation, the graduates' regional origin, household composition and the characteristics of partners all play a role in explaining spatial behavior. Besides individual and household characteristics, educational characteristics play a role too, regarding the spatial behavior of graduates. The following paragraph will discuss these characteristics.

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#### *2.4.2| Educational characteristics*

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Different kinds of the graduate's educational characteristics also tend to influence his or her spatial behavior. First, the spatial distribution of employment opportunities tend to differ between sectors and between graduates of different disciplines. Some sectors benefit strongly from agglomeration economies or clustering. Examples of this are the financial sectors in London and Amsterdam, which may attract graduates of economics from all over the world. Other sectors are more equally spread out. This may be a result of factors related to equitable accessibility (schools, hospitals) or economic organization (retail, consumer services). In order to get a good return on the investment in education, the need to migrate to a certain location

may differ between fields of study. Some disciplines allow the graduate to be rather flexible in terms of the sectors in which the graduate can find a suitable job (for example law and economics). Other disciplines may be more restrictive, like healthcare and teaching. Subsequently, this leads to differences between fields of study in the propensity to be spatially mobile (Venhorst, 2012).

Jaeger and Kreutzer (2012) identified some educational characteristics which relate to the graduate's mobility behavior. First the field of study partly determines the graduate's mobility behavior. The researchers conclude that mainly graduates in the field of economics are tend to move to another region. On the other hand, graduates in social sciences are tend to stay in the study region after graduation. Graduates who did studies in the more specialized and unusual faculties, like textile, fashion and design, tend to be very spatially mobile (Jaeger and Kreuzer, 2012). However, the researchers give no possible explanation for these differences. Coniglio and Prota (2008) found that graduates in business and engineering have a higher propensity to migrate as jobs in these sectors are underrepresented in peripheral areas. Faggian et al. (2007a) found that graduates with arts degrees, which tend to be less specific to employment needs, show lower post-graduation mobility than those with a degree in science or social sciences. In short, there is obviously no clear agreement about the question whether or not the field of study determines the probability to move to another region after graduation.

Hansen et al. (2003) did research on whether or not doing an internship during a study makes a difference when it comes to migration behavior. In their research in Pittsburgh, it is concluded that doing an internship strengthens the students' connection with the region and increases the chance that the student stays in the region after graduation. Thereby, it is sometimes possible for the student to work at the internship company or institution after graduation (Venhorst, 2011b).

The field of study and doing an internship are two interesting factors which influence the spatial behavior of graduates. After graduation, career characteristics influence the spatial behavior as well. The following paragraph will further elaborate on this.

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#### *2.4.3/ Career characteristics*

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Career characteristics play a role in the explanation of spatial mobility behavior too. According to Carree and Kronenburg (2012) for example, graduates are very much attached to career perspectives. They value residential locations which are easily accessible, supposedly as they expect to frequently change jobs in the near future, yet may want to avoid additional residential moves.

Jaeger and Kreutzer (2012) did research on the relationship between mobility behavior of graduates in the German Lower Rhine area and several career characteristics. They found evidence that salary is related to the probability to migrate to another region or not. Jaeger and Kreutzer claim that a very high starting salary can act as a "pull-factor" and is a valuable reason for graduate migration. If wages in a specific area are relatively low, the chance for graduates to move after graduation increases.

Furthermore, the form of job contract relates to graduate migration too. For people with a contract for a full-time-job the probability for migration to external employment markets is noticeably higher. For graduates with fixed-term employment contracts and part time jobs, the propensity to remain in the region is respectively higher. Jaeger and Kreuzer (2012) note that a possible explanation for this is that graduates might be willing to accept less attractive job contracts if their migration cost are low.

Also between the duration of finding an adequate job and migration probability there is detected a connection (Jaeger and Kreuzer, 2012). In the Central Lower Rhine area, the propensity for graduates starting their professional life in the same area lowers considerably when the search for a job takes longer than three months. A possible explanation for this is that graduates might first apply for job offers in the region with the lowest migration costs. But if

they do not find an adequate job within three months, they might be more willing to expand their application range (Jaeger and Kreuzer, 2012).

Besides individualistic characteristics which are discussed so far in this paragraph, 'external' characteristics play a role too regarding the explanation of spatial behavior: regional characteristics. These will be discussed in the following sub-paragraph.

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#### *2.4.4| Regional characteristics*

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Research about the influence of regional characteristics on mobility behavior is focused on two of the region's characteristics: (1) characteristics of the regional economy and (2) facilities/amenities (Venhorst, 2012a). Glaeser and Gottlieb (2006) found evidence that the availability of amenities plays a crucial role in attracting highly skilled people. Also Gertler (2005) emphasizes the role of 'quality of place' characteristics that determine a region's ability to retain well-educated labor and attract it from elsewhere.

However, Storper and Scott (2009) criticize the dominant role which is attributed to amenities. They state that employment opportunities are way more important and outweigh amenities in determining spatial behavior of highly skilled people. Also Gottlieb and Joseph (2006) for the United States and Détang-Dessendre (1999) for France, indicate that, especially for younger individuals, economic considerations are of major importance in location decisions. Partridge (2010) tries to explain post-war growth rates in the more peripheral areas of the United States and concludes that the growth patterns are predominantly amenity-driven (Venhorst, 2012). Thereby, a region highly developed in terms of per capita real income, but plagued by pollution, crime, congestion, overcrowded schools, and health facilities, might be considered less developed if the change in utility is used as the metric of development (Mathur and Stein, 2005).

Shortly, it can be stated there is little consensus about which regional factors predominantly determine the spatial behavior of highly skilled people. This sub-paragraph will firstly discuss the relationship between the characteristics of the regional economy and the spatial behavior of human capital and secondly the relationship between the availability of amenities and the spatial behavior of human capital. In addition this paragraph will discuss the importance of the regional housing market and regional accessibility, since these two are considered as two important determinants of spatial behavior too and therefore need extra attention (Hansen et al., 2003; Venhorst, 2012; ESPON, 2013; Regional Development Council, 2004; Jaeger and Kreuzer, 2012).

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##### *2.4.4.1 Regional economy*

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Venhorst et al. (2011a) did research on the mobility of Dutch graduates in the period between 1997 and 2008. They concluded the presence of a big labor market plays a crucial role in the mobility behavior of highly skilled graduates. Graduates find it very important to have many chances on the labor market. Also Haapanen and Tervo (2012) conclude that graduates preferably choose a place to live in which the labor market is big and developed. Generally, when the regional employment rates are higher, the probability for a graduate to stay in the region after graduation is higher too. This is at least the case in big, metropolitan regions. However, also in smaller urban regions with a university it is possible the graduate develops location specific human capital which makes him stay in the region (Haapanen and Tervo, 2012).

According to Haapanen Tervo (2012) the regional unemployment rates are an important factor in explaining mobility behavior of highly skilled graduates. The probability for the graduate to leave the region increases when regional unemployment rates increase. In this case, it can also be stated that employment rates are important too when it comes to retaining highly skilled people in the region.

Regional wage levels play a role in explaining mobility behavior too. Hansen et al. (2003) did research on the mobility behavior of graduates of the universities in the Pittsburgh region in the United States. They found out many graduates leave this escalator region because of the low wages and the limited opportunities on the local labor market. However, Hansen does not claim wage levels are the only factors which explains the mobility behavior of higher skilled people. The presence of interesting jobs with chances to get promoted in the region proves to be a more important factor in explaining spatial mobility of human capital (Hansen et al., 2003).

Florida (2000) emphasizes the possibility for graduates to find *another* job as an important factor in explaining spatial mobility behavior. The proximity of jobs within a certain distance is very important. Florida's study shows that graduates move to places where it is relatively easy to find *another* job. Because of a decreasing loyalty towards companies and the expectation of a career which is characterized by lots of changes and mobility, many graduates prefer to live in a region with a diversity of employers. In Florida's words: 'locations with thick labor markets' (Florida, 2000). It is, therefore, likely that regions with a university, but a low diversity of employers for highly skilled people, function as an escalator region whereby graduates leave the region after graduation. For regions with a university and a high diversity of employers for highly skilled people it is more likely to function as a 'magnet region'. In this latter case, the chance for graduates to stay in the region after graduation increases.

Like mentioned before, there is little consensus whether regional economy or regional amenities play a bigger role in determining spatial behavior of higher educated people. After discussing the influence of regional economy, the next sub-paragraph will discuss the influences of regional amenities.

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#### *2.4.4.2 Amenities and educated workers*

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There is little consensus on which factors attract highly skilled labor and shapes the economic distribution of human capital when it comes to amenities. The most important approach in this respect is suggested by Florida and colleagues (2000). According to these researchers amenities are one of the most important factors attracting human capital. Glaeser, Kolko and Saiz (2000) even state that: "In the next century, as human beings continue to get richer, quality of life will get increasingly critical in determining the attractiveness of particular areas." The implication of this amenity literature is that, since the demand for amenities rises with income, it could be a very potent policy instrument in the overall strategy to attract knowledge workers to cities and regions.

Gottlieb and Joseph (2006) did research on the mobility behavior of graduates in the field of technology in the United States. Thereby they paid attention to the importance of regional economic characteristics versus regional amenities. Gottlieb and Joseph also concluded regional economic characteristics play a more important role in explaining mobility behavior than amenities. However, amenities play a more important role when the graduates get older and earn more personal human capital. Darchen and Tremblay (2010) did a comparable conclusion. In their research on the mobility behavior of graduates in Ottawa and Montreal, job opportunities play a more important role than amenities in the explanation of mobility behavior. However, when the graduate gets a permanent job and certainty in his career, the place of living should meet more requirements. In that case, amenities begin to play an important role in influencing the mobility behavior of highly skilled people. Whisler et al. (2008) show that motives to move differ between different groups (life stages) in society. Economical motives play a more important role for people who graduated recently than for those who are in a later life stage (Gottlieb and Joseph, 2006). Thereby, the higher the income, the more important amenities are in determining the mobility behavior (Darchen and Tremblay, 2010).

Florida (2000) focused on the mobility behavior of people with human capital in the fifty most populous urban areas of the United States. Since people who are highly educated have many job opportunities, they are able to find a place of living whereby both economic as lifestyle considerations are taken into account. Next to economic, the latter considerations do matter

according to Florida. Firstly, skilled people attract other skilled people. Secondly, skilled people are looking for a place to live with 'quality of place', places which are characterized by cultural and recreational facilities. visual and audio cues such as outdoor dining, active outdoor recreation, a thriving music scene, active nightlife, and bustling street scene as important attractants (Florida, 2000). Florida's study shows that some amenities do matter more than others. Highly skilled people tend to appreciate cultural amenities more than recreational amenities or climate. It is therefore to be expected that regions with a university but with a low diversity of amenities for highly skilled people function as an escalator region. At the other hand it is to be expected that regions with an university and a high diversity of amenities probably function as a magnet region. However, it should be emphasized that economic characteristics still have bigger impact on mobility behavior than amenities.

Besides regional economic characteristics and regional amenities, the regional housing market and accessibility need extra attention as well. Next sub-paragraph will first discuss the role of the regional housing market on the spatial behavior of higher educated people.

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#### *2.4.4.3 Housing market*

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According to many researchers amenities play a subordinate role in explaining spatial mobility behavior. For example, Venhorst (2012a) claims, despite the fact higher skilled people seem to appreciate amenities more than others, amenities do not explain the graduates' spatial behavior. Venhorst concludes graduates tend to move out of regions with high housing prices. More expensive ones with higher housing prices tend to have better and more amenities, like a wide range of consumer services (Venhorst, 2012a).

Hensen et al. (2003) discusses the problems that the Pittsburgh region was having in retaining graduates for the local labor market. A survey among stayers pointed out regional economic conditions, opportunities for further education but also low-cost housing is an important 'keep' factor. Also Venhorst (2012) found that a relatively high cost of living, as measured by the average value of housing in the study region, increases the probability for students of applied sciences to leave the region after graduation. However, this relationship is less clear for university graduates. Within the Netherlands outmigration of graduates of applied sciences as a result of high costs is almost all towards other parts of the country. For university graduates this effect is found to be a lot smaller. For them it is more common to move over relatively short distances between provinces within the same part of the country. Venhorst (2012) explains this difference by stating that university graduates earn more than graduates of applied sciences, which is why the cost of living is less critical in location decisions. Overall, Venhorst (2012) found that graduates move away from expensive, or high in demand, regions, rather than towards them. These findings do not support the arguments for amenity-driven migration flow for this particular group.

Finally, regional accessibility needs to be discussed as one of the major determinants of spatial behavior. Next sub-paragraph will shortly discuss this final factor.

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#### *2.4.4.4 Regional accessibility*

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Good transport infrastructure is one of the keys to regional development. Accessibility describes how easily people in one region can reach people in other regions. Thereby, it shows how well a region is connected to potential markets and cooperation partners in other parts of the country or Europe. Accessible regions enjoy generally more competitive market positions (ESPON,2013). Reliable, accessible and affordable transport and telecommunication infrastructure and services are essential to maintaining family, social, and professional links. They reduce perceptions of isolation and remoteness, and can have a significant impact on individual and family decisions to live and work in regional areas (Regional Development Council, 2004). Also Jaeger and Kreutzer

(2012) found evidence that accessibility and infrastructure are location factors that speak in favor of remaining in the region of study. Therefore, it is important to take infrastructure into account as a factor which influences the mobility behavior of higher educated graduates.

Since a couple of years, the bike takes increasingly part of the modern lifestyle. The bike is a conscious choice for in particular young and highly educated people. This generation is less attached to cars than older generations (ESPON, 2013). Therefore it is also important to take into account that a good infrastructure for bikes plays a role too in the retaining of higher educated.

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#### 2.4.4.5 An overview

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It may be clear that many factors influence the probability for a graduate to move. This paragraph presented a great diversity of characteristics and elements which play a role in explaining the flows of graduates, which will be discussed in the following paragraph. However, table 2.1 gives first an overview to summarize the discussed determinants.

**Table 2.1: An overview of determinants**

Personal & household characteristics	Educational characteristics	Career characteristics	Regional characteristics
Life stage	Field of study	Salary	Regional economy
Gender	Internship	Form of job contract	Regional amenities
Time after graduation		Duration finding fitting job	Regional housing market
Regional origin			Regional accessibility
Household composition			
Partner's situation			

Before the case study of this research gets introduced, the next paragraph will outline the flows of graduates within the Netherlands. This paragraph aims to give a clear framework for the case study of this research: Arnhem Nijmegen City Region.

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#### 2.5| The Randstad: a magnet for highly educated graduates

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It may be clear that there is more and more empirical evidence to show that higher educated are an important determinant of economic growth. Because of this, policymakers are eager to keep their graduates in their region. The 'relocation patterns' towards and from student cities differ compared to the national patterns. The 'student pattern' is characterized by a major inflow of 18 and 19 years old. Regarding the outflow, the chances to leave are bigger for the 25 years old and the chances to leave are lower for 19 years old than the national norm. After graduation graduates often leave their place of study for a job elsewhere. However, this 'student pattern' differs between the different university cities. These differences are related to the location of the student city within the country. For example, this student pattern is way less applicable on the city of Leiden compared to Groningen (Huis and Agtmaal-Wobma, 2009).

The bigger cities and student cities relatively attract many young people. The relocation patterns in these cities considerably differ from the national norm. For example, in the four bigger cities of the Netherlands (Amsterdam, Rotterdam, The Hague and Utrecht), there is a notable outflow of people older than 30 years old and younger than 5 years old. Ultimately, families with young kids leave the cities and singles or couples without children move towards the cities (Latten et al., 2006).

The in- and outflow of people in the city of Groningen is observed by Latten et al. (2008). The university proved to be of major importance in explaining the cities inflow: among the inflowing people between the 18 and 22 years old, 80 percent was student. After graduation many people leave the city to find a job in other regions. More than fifty percent of the people older than 18 who settled in Groningen, left the city already within 5 years. This outflow has a peak under people of 25 years old (Huis and Agtmaal-Wobma, 2009). This pattern, which also can be observed in the four big cities, can be explained by Fieldings escalator region theory, which is explained earlier in this chapter: young people enrich their knowledge and income in an university city and when they reached the top of the escalator, they leave the city (Fielding, 1992).

Also in other student cities this pattern can be observed. The extent to which this pattern is observable in a city depends on the city's specific characteristics. For example do cities differ in size and therefore the proportions of students in the city's population differ. Regarding the job opportunities for highly educated graduates (in the neighborhood of ) the university city, the size of the city and the location within the country matter. Graduates of student cities in the Randstad area have more job opportunities within a certain reach than the ones who graduated in, for example, Groningen. In cities as Enschede and Wageningen, the universities and the related institutions are often important employers. Thereby, graduates can often work at one of the specialized companies which are often settled in the neighborhood of the university and often are subsidized and stimulated by the municipality with the aim to 'fight' braindrain. However, often the outflow of graduates proves to be bigger in peripheral cities (Huis and Agtmaal-Wobma, 2009).

Venhorst (2012) did research on the mobility of higher educated in the Netherlands. This paragraph will outline his findings to give a clear framework for further research in this thesis. Venhorst's findings indicate that there are substantial net flows mainly towards the economic center of the Netherlands. However, there are also flows between peripheral regions and to other countries. Thereby, the findings indicate that university graduates are more spatially mobile than graduates of universities of applied sciences (HBO). And when one looks at spatial behavior according to discipline, there are also clear differences between graduates. However, this does not mean that peripheral regions lose their best graduates. For several disciplines employers in the peripheral areas are able to retain the graduates with the highest grades (Venhorst, 2012). Hensen *et al.* (2009) show that, for the Netherlands, school leavers who are spatially more mobile obtain better job-matches than those who stay in the region of study. Therefore, it is important to put effort into making a match between education and the labor market (Büchel and Van Ham, 2003).

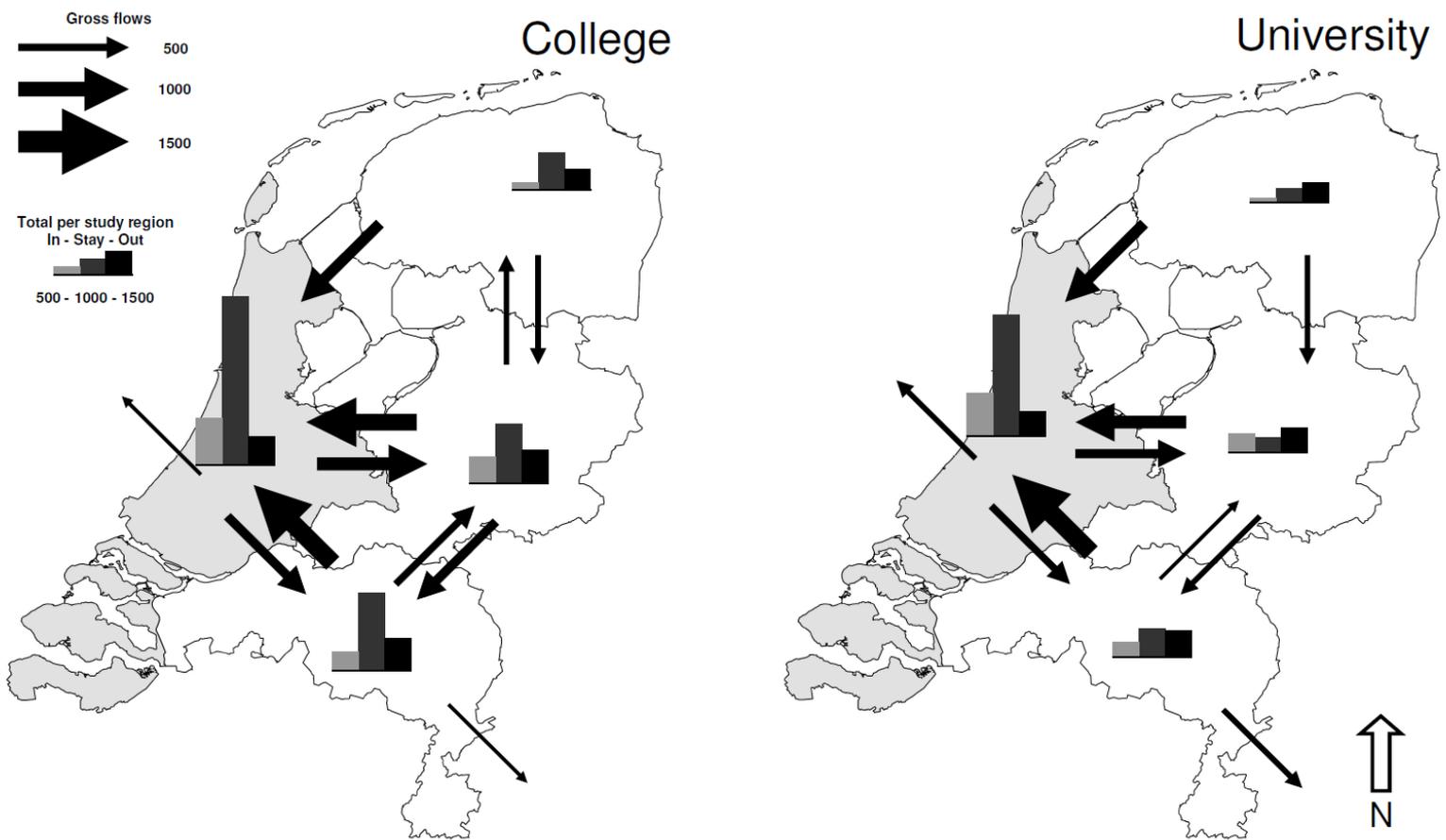
Venhorst (2012) makes in his research a clear distinction between universities of applied sciences (HBO) and universities, because HBO's are spread more evenly throughout the country than universities. Thereby, HBO's have a stronger focus on the regional labor markets than universities. Figure 2.1 shows the migration flows of Dutch graduates between 2003 and 2008, separately for universities of applied sciences (in the figure 'college') and university graduates. The figure shows moves between the four main regions in the Netherlands. The middle bar shows the number of graduates that stay to work in the region of education. The left-hand bar shows the inflow and the right-hand bar the outflow of graduates who have found a job in another region. The arrows show the magnitude and direction of the migration flows (Venhorst, 2012).

For the North and the East it is clear that the numbers of university graduates that leave the study region are bigger than the number of stayers. In the South these numbers are more or less equal. University students in the three peripheral regions (North, East and South) leave the region of study in large numbers: 42 percent of the graduates leave the region of which seven percent goes abroad. The East and South also show substantial inflow from other regions. The inflow in the North, however, is almost negligible. On the other hand, the West gains graduates. The inflow in this region is twice as high as the outflow. This gives rise to a clear pattern of net flows towards the economic center of the Netherlands from the more peripheral North, East and

South. However, the graduates from the East and the South also migrate between these two regions.

The spatial pattern of the migration of HBO graduates is comparable to that of university graduates. However, the intensity of migration is a lot lower. Of the HBO students who graduates in the peripheral regions (North, East and South), about 21 percent leaves the region of study. This includes the three percent that goes abroad. University graduates are thus clearly more tend to leave the region of study than HBO graduates. A possible explanation for this is that universities in many cases are very much specialized in a limited number of disciplines (for example Delft University of Technology, the Eindhoven University of Technology, the University of Twente and the Agricultural University of Wageningen). For universities of applied sciences this specialization is much less marked. However, despite the fact the relative number of HBO graduates that move to another part of the country is lower than the number of university graduates, in absolute numbers the amount of leaving HBO graduates is of the same magnitude as the number of leaving university students. This is because the group of HBO graduates is way bigger than the group of university graduates. Overall, Venhorst (2012) can conclude that there is substantial spatial mobility among graduates (Venhorst, 2012).

Figure 2.1: Migration flows of Dutch graduates, 2003-2008, yearly averages



Source: Venhorst, 2012



← Arnhem

← Heyendaal Centrum

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### 3| A case study: Arnhem Nijmegen City Region

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#### 3.1| Introduction

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In Arnhem Nijmegen City Region has 743.000 inhabitants (Buck Consultants, 2012). 343.000 of them are part of the regional working population. This makes the region the third economic center of the Netherlands, only after the Randstad and the Eindhoven region. The region has a strategic location between the Randstad and the German Ruhr area, which gives it an (inter)national focus (Buck Consultants International, 2012). The Arnhem Nijmegen City Region is already one of the core regions of the Netherlands and has the ambition to strengthen their position as a strong region outside the dominant Randstad region. Due to the available potential in the region, but also due to the effective cooperation of involved municipalities and other parties in the region, Arnhem Nijmegen has been able to build up a strong profile. In combination with the strategic location in the Netherlands and the European transport network, a high labor potential and high quality knowledge institutions, the Arnhem Nijmegen City Region is able to play a role in a (inter)national economic competition (Briesen & Baeten, 2012). Thereby is Arnhem Nijmegen City Region located in various, appealing landscapes: the Veluwe, Betuwe, the river landscape and the Rijk van Nijmegen.

**Figure 3.1: The city region's location between Randstad and Ruhr area**



Source: Arnhem Nijmegen City Region

Since the first of January 2006 there are eight city regions in the Netherlands, including the Arnhem Nijmegen City Region. City regions are special partnerships between municipalities, which are in most cases situated around one or more core municipalities. The Arnhem Nijmegen City Region contains twenty municipalities: Arnhem, Beuningen, Doesburg, Duiven, Groesbeek, Heumen, Lingewaard, Millingen aan de Rijn, Montferland, Mook en Middelaar, Nijmegen, Overbetuwe, Renkum, Rheden, Rijnwaarden, Rozendaal, Ubbergen, Westervoort, Wijchen and Zevenaar. The city region's main aim is to realize an appealing climate for settlement for citizens, entrepreneurs and visitors. Next to this goals, the region also has the ambition to retain its strong, recognizable identity and to strengthen the quality of its current space. The region set up four main themes:

1. Economy: strengthening of the economic climate for settlement in (inter)national perspective.
2. Mobility: improvement of the region's accessibility, whereby mobility by car, train, bus and bike are better integrated.
3. Landscape: increasing the accessibility and attractiveness of rural areas for nature and recreation.
4. Living: improving the quality of living in city, village and in rural areas, whereby the relations with landscape, accessibility and facilities are qualities (Briesen & Baeten, 2012).

**Figure 3.2: Arnhem Nijmegen City Region in detail**



Source: Stadsregio Arnhem Nijmegen

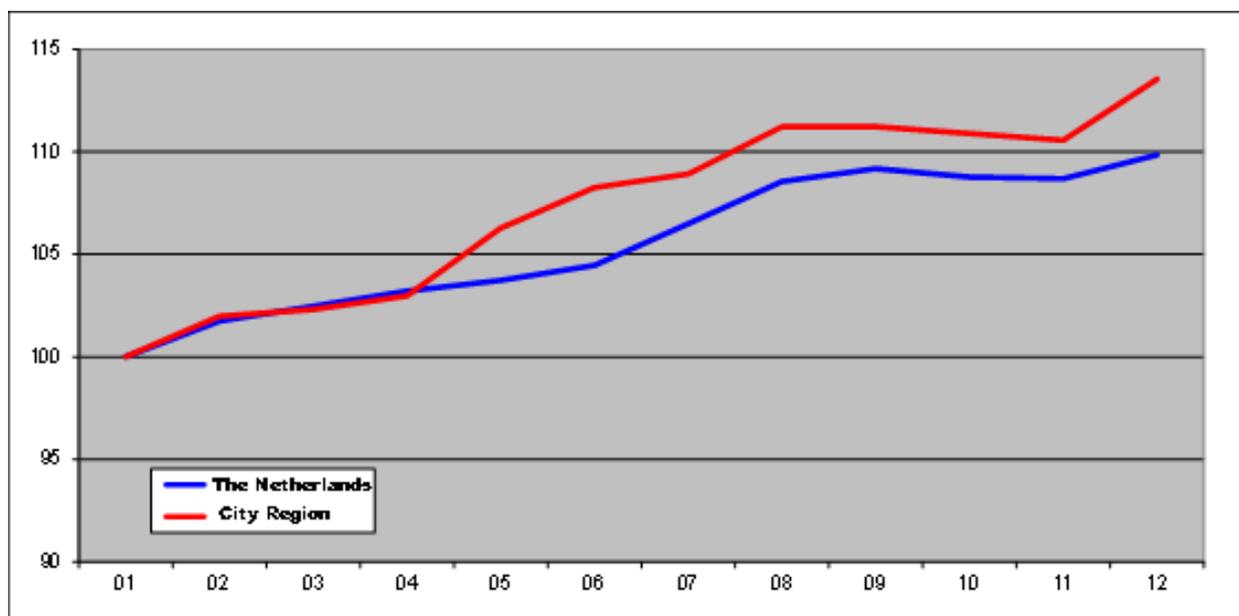
This paragraph will outline the most important social-economic characteristics of Arnhem Nijmegen City Region. This outline will create a clearer profile of the region's regional economy. The numbers will be, if possible, compared with the national norm.

Arnhem Nijmegen City Region is –despite the recent economic crisis- an economically healthy area. This is the conclusion of the Rabobank, a bank which did research on the economic condition of the area (Briesen & Baeten, 2012). The future looks positive too. In the region are several elements which make the region competitive: favorable demographic and employment rate developments, a financially healthy business climate, a population which is relatively highly educated and a favorable location within the Netherlands and Europe. However, Rabobank also concludes that other comparable regions in the country perform better. Regions as Eindhoven and Zwolle relatively profit more of their regional economic elements. Arnhem Nijmegen City Region has the ambition to be the strongest economic region outside the Randstad region in 2020. This will, however, be a major challenge (Briesen & Baeten, 2012).

As mentioned before, there are 743.200 people living in Arnhem Nijmegen City Region. Within the region there is a clear urbanized area where the population is continuously growing. In this area (the municipalities Arnhem, Lingewaard, Overbetuwe, Nijmegen and Wijchen) 452.000 people are living, which is more than 60% of the whole population in the city region. In the peripheral areas within the city region the population numbers are mainly slightly decreasing.

The labor force in Arnhem Nijmegen City Region has grown since 2005 with 7% (figure 3.3). This barely differs from the national growth of 6%. Nationally, but also regionally, it is visible that the growth of the labor force reacts on economic changes. In the period between 2005 and 2008 there is a clear growth. However, after 2008 there is a little dip. In 2012 there is, especially in Arnhem Nijmegen City Region, a notable growth of the labor force.

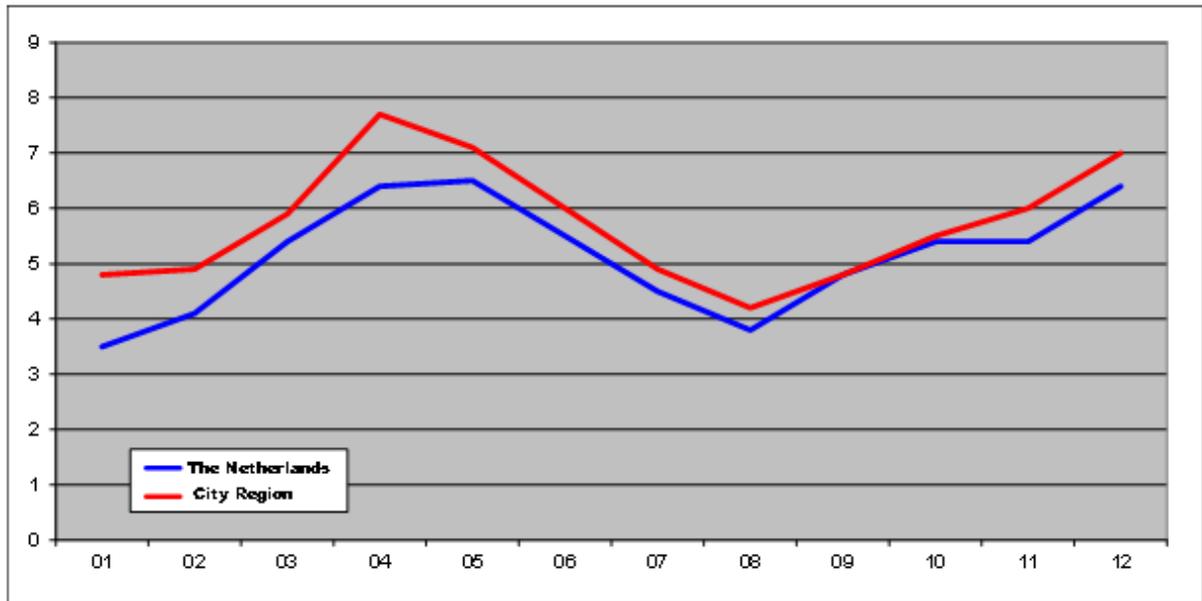
Figure 3.3: The development of the regional and national labor force (index:2000 =100).



Source: CBS, O&S-Nijmegen

Despite the fast growth of the labor force, the unemployment rates (figure 3.4) reached a historic bottom point in 2008 (4,2%). Over the years, the difference between Arnhem Nijmegen City Region and the Netherlands has decreased. After 2008 the unemployment rates in Arnhem Nijmegen and the Netherlands clearly increased again.

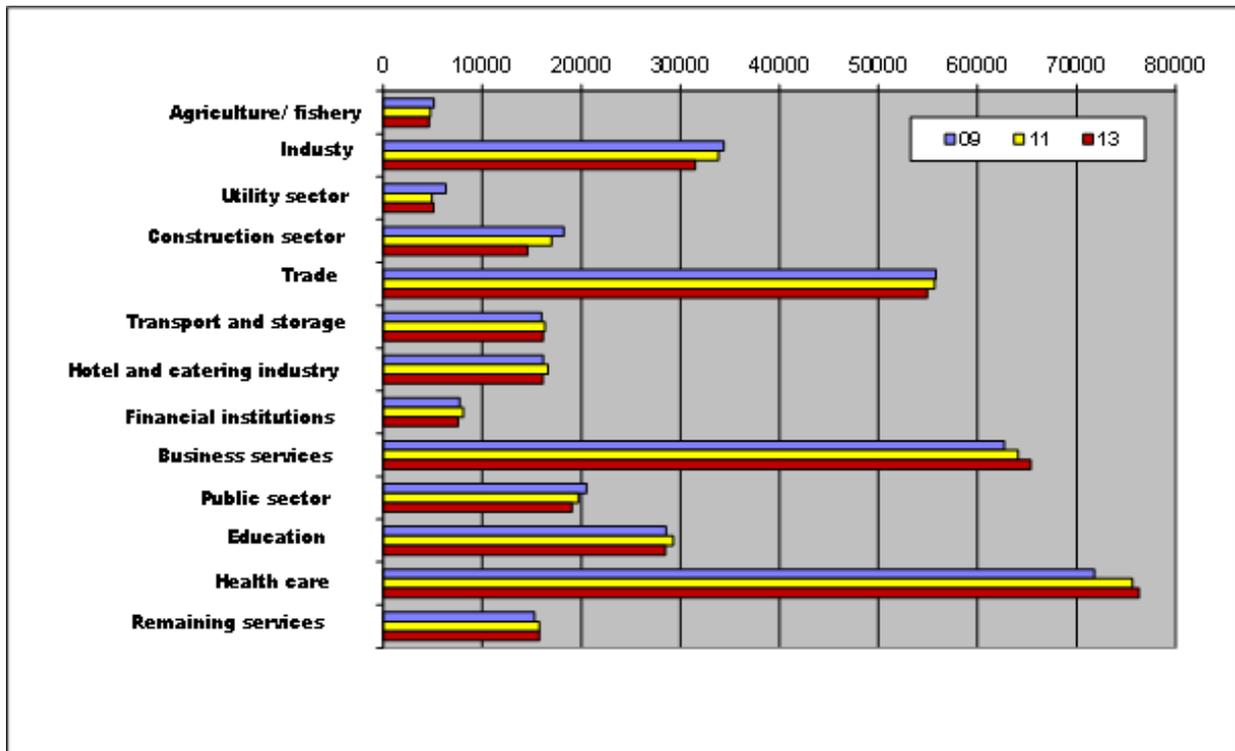
Figure 3.4: Unemployment rates in Arnhem Nijmegen City Region and the Netherlands



Source: CBS, O&S-Nijmegen

In Arnhem Nijmegen City Region are 255.600 jobs and 57.200 companies and institutions. (figure 3.5). Between 2009 and 2013 the amount of jobs shrank with 3000 jobs (0,9%). This is less than the national decrease of jobs (-1,8%). Between 2009 and 2013 the construction sector and the utility sector suffered the most. Both sectors shrank with 20%. Also the agriculture sector, the industrial sector and the public sector shrank all approximately 8%. The health sector clearly grew between 2009 and 2013 (+6%), just as the business services (+4%).

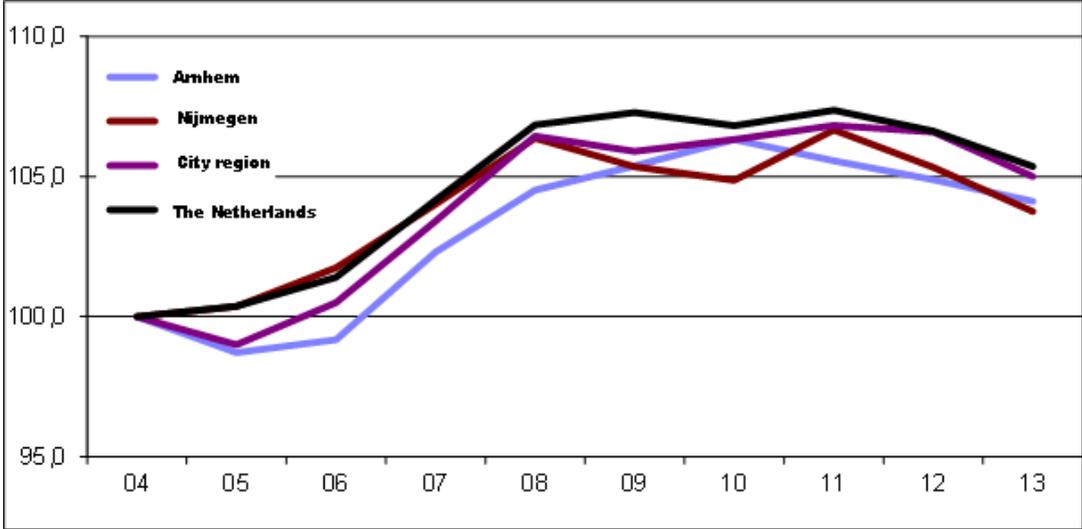
Figure 3.5: Employment development Arnhem Nijmegen City Region 2009-2013



Source: PWE-2013, O&S-Nijmegen

A major part of the jobs (55%) in Arnhem Nijmegen City Region are in Arnhem (99.840) and Nijmegen (96.960) (figure 3.6). Both cities have their own economic specializations which makes them important national players. Arnhem is strong in the energy sector, financial institutions, business services and public services. These important carriers of the office sector include 38% of the jobs in Arnhem and 19% of the jobs in Nijmegen. In Nijmegen the education and health cluster are the most important carriers of the local economy. This sector includes 51% of the jobs in Nijmegen and 31% of the jobs in Arnhem.

**Figure 3.6: Growth of jobs Arnhem and Nijmegen, city region and the Netherlands, 2004-2013 with index 2004=100**



Source: PWE-Gelderland 2013, LISA-2013, bew. O&S-Nijmegen

These sectors are framed into a policy which aims to distinguish Arnhem Nijmegen City Region compared to other regions in the country and in the world. The next paragraph will put the region into a national and an international perspective and will elaborate on the role of the top sectors in the region’s competitiveness.

3.3| Arnhem Nijmegen City Region in a national and European perspective

From an economical point of view, cities and clusters are very important. According to various national and international studies businesses in urban areas and clusters are more productive, experience greater growth and are more innovative than businesses located in non-urban areas. Within the Netherlands there are considerable differences in the functioning and performance of regional economies (PBL, 2013).

Spatial economic policy in the Netherlands has been developed over the last few decades with two types of objectives in mind. The first objective was to remove regional disadvantages or to support sectors in specific regions. Through this equity policy, the government aimed to reduce regional economic inequalities. On the other hand, the second objective has focused on the strengths and potentials of individual regions. Through this second objective, which could be described as a efficiency policy, the government aimed to stimulate productivity and export. The equity policy was dominant in Dutch policy until 2000. However, this trend changed with the 2004 policy report *Pieken in de Delta* (Peaks in the Delta) in which the equity policy was completely renounced. Since then, spatial economic policy has focused mainly on the growth capacity of the Dutch economy and on improving the competitive position of the country. The *Pieken in de Delta* report focused on the stimulation of economic growth in every region by making use of region-specific opportunities that would have an effect at the national level (competitive advantages). The Ministry of Economic Affairs has continued this focus on

efficiency in its top sector approach in the *Bedrijfslevennota* (trade and industry memorandum). This policy is focused on strengthening the competitive position of the Netherlands based on the ambition to make the country one of the strongest knowledge economies in the world. This report advocates focusing on the country's top nine economic sectors and to a much less extent on the regions. Whereas Pieken in de Delta is based on the regions, with peaks (in other words sectors) defined within these regions, the top sectors perspective in the *Bedrijfslevennota* focuses mainly on a sectorial approach, with much less emphasis on the region (PBL, 2013). In the literature, this discussion is known as the 'place-based' versus the 'place-neutral' debate (Barca, McCann, Rodriguez-Pose, 2012). The Dutch government aims to strengthen the country's competitiveness. To do so, the government selected some top sectors and top regions to stimulate economic growth and to raise the potential to innovate (Briesen & Baeten, 2012). The Life Sciences/Health top sector is clustered mainly in the Randstad, but there are also a few smaller clusters, such as Oss, Eindhoven and Arnhem-Nijmegen (PBL, 2013).

The strong focus on strengthening the competitive position of the country and the region fits within the European policy of *smart specialization*. Smart specialization is a new innovation policy concept which aims to boost regional innovation in order to achieve economic growth and prosperity by enabling regions to focus on their strengths –or in other words- their competitive advantages. By focusing on strengths, smart specialization prevents investments to be spread too thinly across several frontier sectors. Smart specialization needs to be based on a strong partnership between businesses, public entities and knowledge institutions – such partnerships are recognized as essential for success. As explained in the previous chapter, this kind of partnership is known as the *triple helix* model. Smart specialization should help regions to identify high-value added activities which offer the best chances of strengthening the region's competitiveness (European Commission, 2014).

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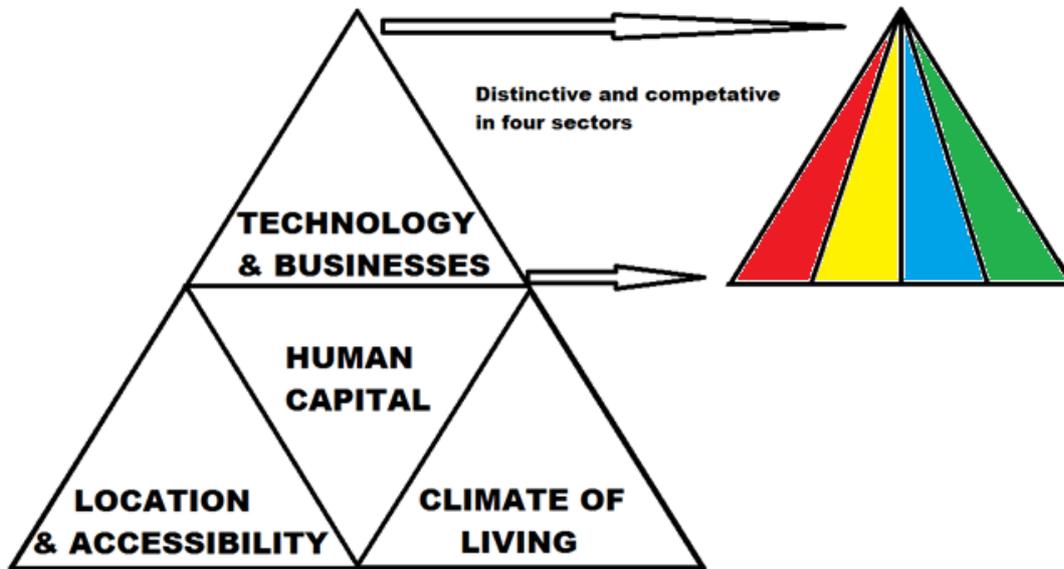
### 3.4/ The top sectors in Arnhem Nijmegen City Region

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As mentioned before, Arnhem Nijmegen City Region is considered to be the third economic area of the Netherlands. This is mainly because of the presence of five strong clusters which are situated in the city region. Health & Technology, Energy & Environmental Technologies, Fashion & Design, Tourism and Logistics are the clusters which make the Arnhem Nijmegen City Region distinctive and competitive. High educated people are therefore very important to strengthen these clusters to retain the region's (inter)national position. In the framework of the theories discussed in the previous chapter, top sectors has everything to do with clusters. Porter (1990) emphasized the importance of concentrations of industries and competition with similar kind of companies for the economic growth on regional scale. Porter argues that cooperation within a heterogeneous group of organizations in a cluster leads to the composition of visions and signaling bottlenecks and chances (Porter, 1990). Top sectors, therefore, can be considered as the region's competitive advantages (figure 3.7).

The tourism sector will be excluded in this research, since there is no related form of higher education in the region. In the next chapters it will become clear which profile leaving and staying graduates have in the Arnhem Nijmegen City Region. In this respect, an important question is: do graduates who have knowledge in the four top sectors in the region tend to stay or to leave the region, and which motives are the reason behind their decision? The city region's policy can be visualized as in figure... The policy is based on a strong basis of 'location and accessibility', 'human capital' and 'climate of living'. On top of that the region distinguishes itself with four top sectors. In this paragraph, these four top sectors will be explained and discussed.

Figure 3.7 A strong basis with distinctive competences in four sectors



Source: Buck Consultants International, 2012

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### *3.4.1 Health & Technology*

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The healthcare system in the Netherlands -and in Europe as a whole- is facing a couple of serious challenges, in particular an ageing population, an increase of chronic diseases, higher consumer demands, increasing expenses in healthcare and an increasing demand for labor. To keep the costs manageable, to improve the quality of healthcare and to limit the increasing demand for labor, innovations in healthcare are deemed necessary. Ideally, these innovations lead to economic returns and new export possibilities. Since a couple of years the extension of the health cluster is one of the spearheads of regional economic policy in eastern Netherlands. This cluster consists of all kinds of businesses which are engaged with R&D, production, trade and/or services in the field of health technology, medicines, e-health etcetera. Depending on the delineation of the cluster, the cluster consists of 7.000-15.000 businesses in eastern Netherlands and 200.000-250.000 employees. Arnhem Nijmegen City Region hosts approximately 2.000 businesses and 50.000 employees within the sector of Health Technology. A number of businesses in this cluster are united in the 'Health Valley platform'. This is a platform for businesses, health- and knowledge institutions with the aim to develop innovation activities in the field of Health & Technology. Leading firms in this cluster in the Arnhem Nijmegen City Region are, among others, Synthon, MercaChem, LeadPharma, Future Diagnostics, NovioGendix and NXP. Leading knowledge is present at the Radboud University, UMCN, HAN and the St. Maartenskliniek (Buck Consultants International, 2012).

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### *3.4.2 Energy & Environmental Technologies*

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Eastern Netherlands currently develops a strong and (inter)national oriented cluster of Energy & Environmental Technologies, with one of its centers in Arnhem. The cluster is developing quickly and has a fertile breeding ground in the region. In the Arnhem Nijmegen City Region are approximately 20.000 employees in this cluster. In the whole eastern Netherlands this amount is even bigger: more than 60.000. Leading firms in the city region are KEMA, Tennet, Alliander, Akzo Nobel, Royal Haskoning, Arcadis and Exendis. The HAN, the Radboud University and the Wageningen University (which is located just outside the city region) are leading knowledge institutions in the field of Energy & Environmental Technologies. The cluster's power gives

opportunities to realize a durable and healthy climate for living. The region's ambition is to become an (inter)national example region, whereby knowledge about renewable energy gets developed, applied and exported (Buck Consultants International, 2012).

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### 3.4.3 Fashion & Design

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One of the four main clusters in the Arnhem Nijmegen City Region is Fashion & Design. This cluster is clearly localized in Arnhem. For some decades Arnhem has a national and international reputation as a fashion city. In Arnhem Nijmegen City Region are approximately 24.000 employees working in the Fashion & Design cluster. The strongly developed fashion cluster is unique and functions as a source for international talent. Leader organizations are the ArtEZ art academy, the research and knowledge center for creative economy ARCCI and the HAN. Since some time, many fashion facilities have been developed in Arnhem. A couple of years ago, for example, the fashion area in Klarendal is developed which offers artist places to start a shop or gallery, or to live. During past decades, the quantity of businesses in the Fashion & Design cluster has increased with more than 60%. The cluster contributes substantially to the creativity and innovation in the other (top) sectors in the region (Buck Consultants International, 2012).

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### 3.4.4 Logistics

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Arnhem Nijmegen City Region is a logistic hotspot. The region has a very favorable location between the European hinterland and the two important main ports of the Netherlands: Schiphol airport and the harbor of Rotterdam (figure 3.1). The transport and logistic sector is of major importance in Arnhem Nijmegen City Region. The concentration of logistic activities is the most visible on the logistic park of Bijsterhuizen, the A12 zone, BusinessPark 7Poort and the A15 zone Park15. In 2010 25.900 people worked in the region's logistic sector. In the area around the municipalities Montferland, Duiven and Zevenaar 11,7% of the working population works in the logistics sector, which is comparable to the main ports (Groot)-Amsterdam and Rotterdam-Rijnmond (Arnhem Nijmegen City Region, 2014).

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### 3.5| Conclusion and conceptual model

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As the theoretical framework shows, the graduates' mobility behavior is influenced by several factors. In this research this relationship will be tested statistically. The relations are visualized in the conceptual model (figure..). Fielding's theory of the escalator region is used as the central concept in this research. Because of the simplification of the complex system of mobility flows, this research uses more theories to enrich Fielding's theory. In this model the 'mobility behavior' is the dependent variable. The personal and regional characteristics are the independent variables which influence the dependent variable.

The personal characteristics which will be examined in this research are age, gender, composition of household, length of stay in the region and place of residence during youth. The gender of the graduate is considered to be an important factor in explaining the mobility behavior of the graduate. Although different opinions on the matter exist in scholarly literature, it is expected that woman are spatially less mobile than men (van Ham,2002; van Ham and Hooimeijer, 2008; van Wee, 1992). It is also expected that the composition of the household influences the spatial mobility behavior of the graduates. Families have to deal with much more time-space limitations than one man households, which makes one man households spatially more flexible than families (Carree and Kronenberg, 2012). The length of time after graduation also influences the individuals' migration behavior. According to the theory of Haapanen and Tervo (2012) it can be expected that graduates who live in the region of study for a longer period, have a greater probability of staying (*cumulative inertia*). Therefore, it is expected that respondents who graduated relatively long ago (before 2008) and do not live in the region of study anymore, are more willing to move back to this region than respondents who graduated

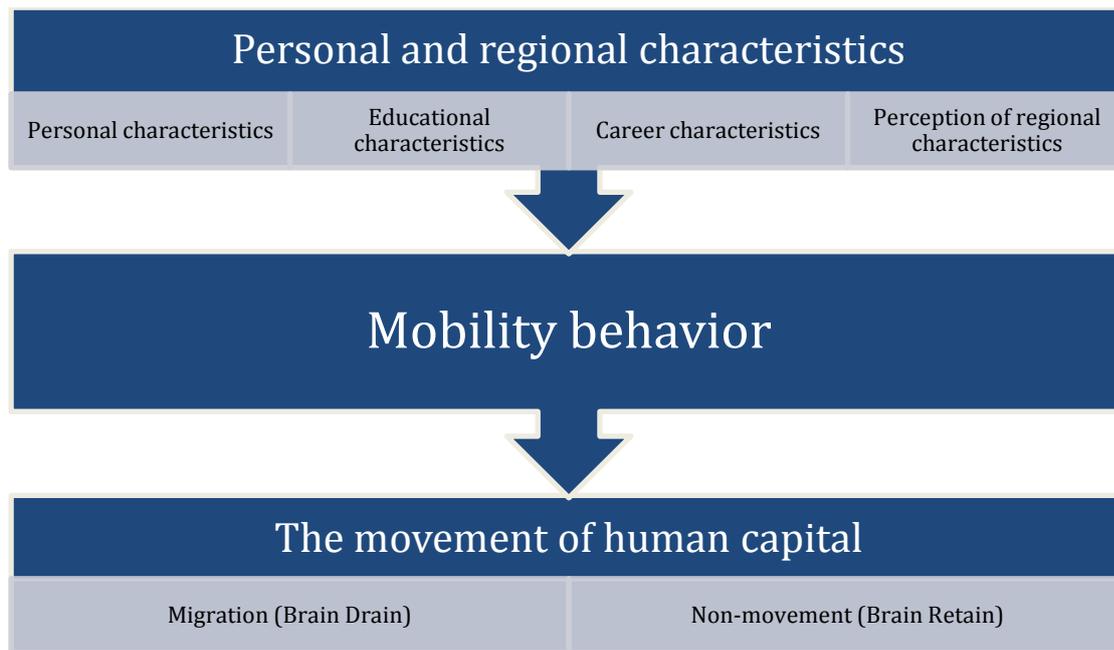
more recently. In this respect, the region of study functions as an escalator region for younger graduates (Fielding, 1992). Finally, the place where the graduate originally comes from plays a role in the explanation of spatial mobility behavior. Many graduates stay in the city or region they are familiar with and return to their region of origin (Venhorst, 2012b).

Since there is a lot of debate about the influence of educational characteristics on the graduate's mobility behavior, this research does not take into account all factors which are discussed in the theoretical framework. However, it is expected in this research that it is more probable that graduates who did an internship in the region of study stay in the region more often after graduation compared to the graduates who did not. The authors in the literature agree about the influence of this factor on the mobility behavior of graduates, since an internship gives the graduate the opportunity to build up a network and therefore feels connected with the region (Hansen et al., 2003; Haapanen and Tervo, 2011). It is also expected that graduates who did an internship at a company which relates to the region's top sectors are more tend to stay in the region than graduates who did not.

Career characteristics also influence the graduate's mobility behavior. The location of work is one of these characteristics. In the literature it is mentioned that the location of work often determines where the graduate lives (Gottlieb and Joseph, 2006). It is expected that people who work in Arnhem Nijmegen City Region live in the region too. Also the sector in which the graduate has a job plays a role in explaining the mobility behavior. It is expected that a graduate who works in one of the region's top sectors lives in the region more often than graduates who work in other sectors. Furthermore, the length a graduate needs to find a fitting job after graduation also influences the probability for the graduate to leave the region of study or not (Jaeger and Kreutzer, 2012). Therefore it is expected that graduates who found their first job later than three months after graduation live outside the region of study more often than graduates who found a fitting job within three months.

Besides personal characteristics the perception of regional characteristics play a role too, when it comes to explaining spatial behavior. According to some authors the quality of life will get increasingly critical in determining the attractiveness of particular areas (Glaeser, Kolko and Saiz, 2000). Therefore, it can be expected that graduates who do not live in the region of study anymore but highly value the working- and living environment in the region of study are more willing to move to this region than graduates who do less value the working- and living environment in the region. Additionally, it can be expected that graduates who live in the region of study and have a negative perception of the working- and living environment in the region more wish to leave the region than graduates who have a more positive perception of the working- and living environment in the region. In the next paragraph all these hypotheses are outlined more concrete.

Figure 3.8: Conceptual model



### 3.5.1| Hypotheses

The conceptual model which is presented in the previous paragraph forms the basis for the hypotheses which will be tested in this research. This paragraph will concretely outline these hypotheses.

The first hypotheses will test if Arnhem Nijmegen City Region functions as an escalator region (Fielding, 1992), whereby students leave the region after graduation to find a job or to start a family. According to Van Ham and Hooimeijer (2008) this is especially the case for intermediary and peripheral regions outside the core Randstad region. The expectation is that this outflow of graduates is caused by, among other reasons, an inadequate regional labor market. Are the students who studied in Arnhem Nijmegen City Region locally or regionally 'rooted' or is there a clear outflow of graduates towards, for example, the Randstad?

#### Hypothesis 1

Graduates who lived in Arnhem Nijmegen City Region during their graduation did leave their region of living more often after graduation compared to graduates who lived outside Arnhem Nijmegen City Region during their graduation.

The second hypothesis is about the relationship between familiarity with a region and mobility behavior. Like Venhorst (2012b) suggested, familiarity with the region affects the direction of migration. Many graduates return to their region of origin. This hypothesis is also based on Sjaastad's (1992) classic model of maximization of benefits in which the psychological effects of leaving a familiar area is considered as a cost.

#### Hypothesis 2

Graduates who lived in Arnhem Nijmegen City Region during the longest part of their youth live in Arnhem Nijmegen City Region more often than graduates who lived elsewhere during the longest part of their youth.

The third hypothesis tests if graduates who did an internship in Arnhem Nijmegen City Region stay within the region after graduation more often than graduates who did not an internship in Arnhem Nijmegen City Region. According to the literature an internship is a binding factor, which increases the probability for the graduate to stay in the region after graduation (Hansen et al., 2003). By doing an internship the graduate builds up a network and therefore feels connected with the region (cumulative inertia; Haapanen and Tervo, 2011).

### Hypothesis 3

Graduates who did an internship in Arnhem Nijmegen City Region during their study do live in Arnhem Nijmegen City Region more often than graduates who did not do an internship in Arnhem Nijmegen City Region during their study.

According to many authors in the academic literature, employment opportunities are the most important factors in determining spatial behavior of highly skilled people. According to the third hypothesis 'living follows working'. Therefore, it is expected that people who work in the Arnhem Nijmegen City Region live in this region more often than people who do not work in Arnhem Nijmegen City Region.

### Hypothesis 4a

Graduates who work in Arnhem Nijmegen City Region live in the city region more often than graduates who do not work in Arnhem Nijmegen City Region.

In addition to hypothesis 4a it also can be expected that in Arnhem Nijmegen City Region there is a clear concentration of jobs in the region's top sectors compared to jobs which are not related to the region's top sectors.

### Hypothesis 4b

Graduates with a job which relates to the region's top sectors relatively do live in Arnhem Nijmegen City Region more often than graduates who have a job which is not related to the region's top sectors.

Arnhem Nijmegen City Region can be characterized as an intermediary or peripheral region outside the core Randstad area. According to the literature and Fielding's (1992) theory, these kinds of regions attract people who are in further on in their (social) careers and already hopped off the escalator. On the other hand, these intermediary or peripheral regions lose young graduates because of the attraction of the Randstad (Venhorst et al., 2011a). The fifth hypothesis is about graduates who do not live in Arnhem Nijmegen City Region anymore. Since the respondents did mostly graduate between 1994 and 2014, the researcher chose to use the middle as the threshold: 2004. The fifth hypothesis is:

### Hypothesis 5

Graduates who graduated before 2004 are more willing to move to Arnhem Nijmegen City Region than graduates who graduates after 2004.

Also between the duration of finding an adequate job and migration probability a connection was detected. The propensity for graduates starting their professional life in the same area as where they studied lowers considerably when the search for a job takes longer than three months (Jaeger and Kreuzer, 2012). Therefore it is expected that graduates who found their first job after graduation within three months live in the city region more often than graduates who did not found a fitting job within three months within Arnhem Nijmegen City Region. This hypothesis is about graduates who lived in Arnhem Nijmegen City Region during their last year of study.

### **Hypothesis 6**

Graduates who found their first job after graduation within three months after graduation live in Arnhem Nijmegen City Region more often than graduates who did not found a fitting job within three months within Arnhem Nijmegen City Region.

According to some authors the quality of life will get increasingly critical in determining the attractiveness of particular areas (Glaeser, Kolko and Saiz, 2000). Quality of place characteristics plays a role in a region's ability to retain well-educated labor and attract it from elsewhere. It can be expected that graduates who highly value the working- and living environment in Arnhem Nijmegen City Region are more willing to move to the city region than graduates who values the working- and living environment in Arnhem Nijmegen City Region less. Hypothesis 6a is about graduates who do not live in Arnhem Nijmegen City Region.

### **Hypothesis 7a**

Graduates with a positive perception of the working- and living environment in Arnhem Nijmegen City Region are more willing to move to the city region than graduates who have a negative perception of the working- and living environment in Arnhem Nijmegen City Region.

In addition to hypothesis 7a it can be expected that graduates who value the working- and living environment in Arnhem Nijmegen City Region less wish to leave the city region than graduates who do not value the working- and living environment in Arnhem Nijmegen City Region. Hypothesis 7b is about graduates who live in Arnhem Nijmegen City Region.

### **Hypothesis 7b**

Graduates with a positive perception of the working- and living environment in Arnhem Nijmegen City Region less wish to leave the city region than graduates who have a negative perception of the working- and living environment in Arnhem Nijmegen City Region.

Although the fact that some authors claim that the quality of life plays a major role in determining the graduate's mobility behavior, most authors emphasize the dominant role of regional economic factors in determining the mobility behavior of highly educated graduates (Storper and Scott, 2009; Gottlieb and Joseph, 2006; Detang-Dessendre, 1999; Haapanen and Tervo, 2012). Therefore it is expected that overall, economic factors play a more important role in explaining the graduates' overall valuation of a region's working- and living environment than other factors.

### **Hypothesis 8**

Economic factors play a more important role in determining the graduates' perception of the regional working- and living environment of Arnhem Nijmegen City Region than other factors do.



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## 4| Methodology

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In the previous sections, an introduction to the proposed area of research was presented. This included a description of the study's research problem, several research purposes, a couple of hypotheses that will serve to direct the data analysis, and an identification of several terms key to the study. This section provides an outline of the research method used in this thesis. It explores which research questions are proposed, how these questions are answered and aims to explain why certain methods are appropriate to answer these questions. Included in the section will be a description of the study setting, proposed research design, study sample, and proposed data collection methods, procedures, and analysis efforts.

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### 4.1 Quantitative research

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To answer the central question of this research, it is necessary to gather information about graduates who studied in the Arnhem Nijmegen City Region. Quantitative research is the most appropriate way to gather this information. Quantitative research is designed to ensure objectivity, generalizability and reliability. These techniques cover the ways research participants are selected randomly from a certain population in an unbiased manner, the standardized intervention they receive and the statistical methods used to test predetermined hypotheses regarding the relationships between specific variables. The researcher is considered external to the actual research, and results are expected to be replicable no matter who conducts the research. An important strength of quantitative research is that it produces quantifiable, reliable data that are usually generalizable to some larger population. The greatest weakness of the quantitative approach, however, is that it ignores human behavior in a way that removes the event from its real word setting and ignores the effects of variables that have not been included in the model (Bryman, 2008).

The overall design of this research will take a quantitative approach, meaning that the researcher will use a formal, objective, systematic process where data are utilized to test the hypotheses which are outlined in paragraph 2.6.1. The dependent variable in this research is 'whether or not the graduate moves out of Arnhem Nijmegen City Region after graduation'. The independent variables are the individual and household characteristics, education characteristics, career characteristics and the perception of the regional characteristics.

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#### 4.1.1 Population and sampling plan

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The population in this research are all graduates who graduated at one of the knowledge institutions of higher education in Arnhem Nijmegen City Region. An internet survey will be sent to master alumni who graduated after the 19<sup>th</sup> of June 1994. Graduates who graduated before 1994 are less relevant in the framework of this research. In the central theoretical concept in this research – the escalator region (Fielding, 1992) – young starters play the main role. According to this theory young people leave the region of study after graduation to find a job and/or start a family elsewhere. However, to find out if the region functions as an escalator region, it is important to figure out if people who did graduate longer than 10 years ago tend to return to Arnhem Nijmegen City Region. Therefore, people who did graduate in the period 1994-2013 will be approached for this research. In this research people from all faculties will be asked to participate in the research. In this way the hypotheses that people who work at a company which is related to one of the region's top sectors are more 'rooted' in the region than others can be tested.

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#### 4.1.2 Data collection

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The online survey is made with the online survey software 'Survey Monkey'. The survey is by means of an introductory letter send to 18.183 master alumni of the Radboud University. This

group graduated between 19-06-1994 and 19-06-2014. The link to the survey is sent by the Radboud University itself. This to protect the graduates' private contact information.

Via the LinkedIn page 'ArtEZ Alumni Networking Group', the survey is sent to 2.615 graduates of the ArtEZ art academy. In this case LinkedIn is used, since the ArtEZ art academy does not have their graduates e-mail addresses.

Together, this makes the total population in this research has a size of 20.798 graduates. The researcher chooses to distribute the survey online, because he expects to get a bigger response in this way than in case of other ways of distribution. The online distribution of the survey is time-saving and for the respondents it costs less time to fill it in (Bryman, 2008). Thereby this is a cheap way to collect data. By filling in the survey respondents have the chance to win one of the five VVV-vouchers of €50,-.

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### 4.1.3 Data analysis

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The data which will be collected in this research will be analyzed with the statistical computer software SPSS. The data will be described and summarized and the relationships between variables will be identified. Before the data will be statistically analyzed, it will be checked if the sample is representable for the whole population. Answers on open questions will be analyzed with *Wordle*. By means of 'word clouds' Wordle shows the relative use of certain words. Words which are used relatively often will be presented bigger and bolder than words which are used less often. By using word clouds the essence of many divers answers will be summarized in a couple important terms. These word clouds are mainly used to present why respondents value the working- and living environment in Arnhem Nijmegen City Region positively or negatively.

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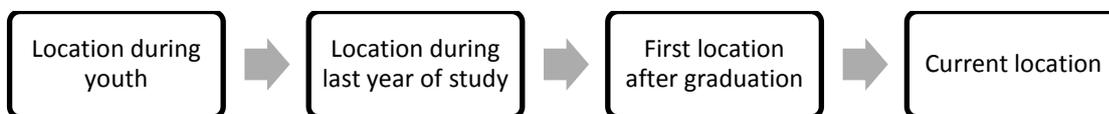
### 4.1.4 Operationalization

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This paragraph gives an overview of the variables which are used to test the hypotheses. The specific choices for the variables are based on the literature in chapter 2 and on the context chapter 3.

To test some hypotheses, it is necessary to know how the respondent's 'housing career' is built up. The location during the respondent's youth, during graduation, the first location after graduation and de current place of living are relevant in the framework of this research. The location choice of residence is the dependent variable in most hypotheses in this research. The independent variables aim to explain the variation of the dependent variable. In the figure below this dependent variable - the housing career - is visualized.

**Figure 4.1: Scheme housing career**



Source: own work

For all the different locations the respondents has to answer in which municipality he or she lived or lives. During analyzing the results, the researcher will determine in which region the respondent lived or lives. The researcher uses the COROP division of regions (figure 11). By using this division of regions a more specific analysis can be done than in the case the researcher uses the less specific division of provinces. Because Arnhem Nijmegen City Region does not totally coincide with the COROP region Arnhem/Nijmegen, this region will be operationalized a the 20 participating municipalities in the city region: Beuningen, Doesburg, Duiven, Groesbeek, Heumen, Lingewaard, Millingen aan de Rijn, Montferland, Mook en Middelaar, Overbetuwe, Renkum, Rheden, Rijnwaarden, Rozendaal, Ubbergen, Westervoort, Wijchen and Zevenaar. The municipality of Mook en Middelaar, which is originally located in the COROP region Noord-

Limburg, will be excluded from this COROP region and added to Arnhem Nijmegen City Region. The same counts for the municipality of Montferland, which is originally part of the COROP region Achterhoek. The municipality of Druten, which is part of the COROP region Arnhem/Nijmegen is not part of Arnhem Nijmegen City Region and will be added to the COROP region Zuidwest-Gelderland.

**Figure 4.2: COROP regions in the Netherlands**



Source: CBS, 2012

### *Location during graduation*

Hypothesis 1 is: *'Graduates who lived in Arnhem Nijmegen City Region during their study did leave their living region more often after graduation compared to graduates who lived outside Arnhem Nijmegen City Region during their study'*. This hypothesis will be tested to compare the location during graduation (Question 15) with whether or not the respondent lives in the same region as they did during their study (Question 17). The respondent can give two answers in question 17: 'yes' and 'no'. In the case respondents answered 'no' on question 17, the location during the last year of study will be compared with the location to which the respondent has moved after graduation (Question 18). To see if hypothesis 1 is indeed true, a bivariate analysis will test if there is a relationship between the two variables.

### *Location during youth*

To test hypothesis 2 '*Graduates who lived in Arnhem Nijmegen City Region during the longest part of their youth live in Arnhem Nijmegen City Region more often than graduates who lived elsewhere during the longest part of their youth*', the location (COROP) during the longest part of the graduate's youth (Question 14) will be compared with the current place of living (Question 22).

### *Place and sector internship*

Hypothesis 3a is: '*graduates who did an internship in Arnhem Nijmegen City Region during their study do live in Arnhem Nijmegen City Region more often than graduates who did not do an internship in Arnhem Nijmegen City Region during their study*'. This hypothesis is about the relationship between the location of the last internship organization and the graduate's current place of living. The graduates will be asked if he or she did an internship during their study (Question 9) and if the answer is yes, the respondent will be asked where he or she did his internship (Question 10). This variable is compared with the respondent's current place of living (Question 22).

Hypothesis 3b is about whether the internship is related to the region's top sectors: '*Graduates who did an internship at an organization which is related to one of the region's top sectors do live in Arnhem Nijmegen City Region more often than graduates who did not an internship at an organization which is related to one of the region's top sectors*'. To test hypothesis 3b it is important to know in which sector the respondent did an internship. To find out whether or not the respondents did an internship in one of the region's top sectors, question 12 will directly ask them to estimate whether or not they did an internship in one of these sectors. When the respondent answers this question with 'no', he or she has to fill in how they would describe the sector they did an internship in. To double check whether or not the respondent did an internship in one of the region's top sectors, the respondents will be asked how they would describe the main tasks they had to do during their internship (Question 13). In this way, the researcher can decide afterwards whether or not the graduate in question did an internship in one of the region's top sectors.

The researcher chose for this approach, because many official divisions which are used to categorize different sectors (for example the Standaard Bedrijfindeling of the Central Office of Statistics) do not coincide with the regional division of top sectors. Therefore it is hard to use such official categorizations in this research. A more open way of asking the respondents in which sector they did an internship is in this research considered to be the most appropriate way. In this way the researcher can decide whether or not the respondent did an internship in one of the region's top sectors.

Not everything in the sectors Health, Creative industry, Energy and Environmental Technologies and Logistics can be considered to be part of the top sector. For example, the public healthcare does not take part of the top sector Health. Therefore, the respondents who answered they did an internship in one of the region's top sectors will be asked another question to check if they really did an internship in one of the region's top sectors. They will be asked what their main tasks were during their internship. On the basis of the Standaard Bedrijfsindeling of the Central Office of Statistics (CBS) a further division between top sectors and non- top sectors will be made afterwards (tables 2,3,4,5).

**Table 4.1: Sub-sectors Health sector**

<b>Health</b>	<b>Part of the top sector?</b>
Pharmacy	Yes
Manufacturing of medical instruments	Yes
Research	Yes
Remaining sectors (including public healthcare)	No

**Table 4.2: Sub-sectors Creative industry**

<b>Creative industry</b>	<b>Part of top sector?</b>
Art	Yes
Cultural heritage	Yes
Media and entertainment industry	Yes
Creative business services	Yes
Remaining sectors	No

**Table 4.3: Sub-sectors Energy and Environmental Technologies**

<b>Energy and Environmental Technologies</b>	<b>Part of top sector?</b>
Gas related	Yes
Sustainable Energy	Yes
Research	Yes
Management and operation of transport networks for electricity, gas and warm water	Yes
Distribution of electricity and gaseous fuels via pipe lines	Yes
Trading in electricity and gas via pipe lines	Yes
Production and distribution of electricity and cooled air	Yes
Manufacturing of batteries	Yes
Remaining sectors	No

**Table 4.4: Sub-sectors Logistics sector**

<b>Logistics</b>	<b>Part of top sector?</b>
Transport and transshipment	Yes
Storage, services and support activities	Yes
Remaining sectors	No

### *Location and sector of work*

Hypothesis 4a tests if there is a relationship between the place of work and the place of living: *'Graduates who work in Arnhem Nijmegen City Region live in the city region more often than graduates who do not work in Arnhem Nijmegen City Region'*. To test if this hypothesis is indeed true, the respondent's current location of residence (Question 22) will be compared with the respondent's current place of working (Question 40). A new variable will be computed for all regions outside Arnhem Nijmegen City Region: *'buiten de stadsregio'*.

In addition, hypothesis 4b will test if there is a relationship between the sector which the graduate's job relates to and the graduate's current place of living. For this hypothesis the same operationalization of sectors will be applied as in hypothesis 3b.

### *Year of graduation*

The fifth hypothesis is: *'Graduates who graduated before 2004 are more willing to move to Arnhem Nijmegen City Region than graduates who graduated after 2004'*. Since the respondents did mostly graduate between 1994 and 2014, the researcher chose to use the middle as the threshold: 2004. To test this hypothesis, again two variables will be statistically compared with each other, namely the year of graduation (Question 8) and the willingness to move to Arnhem Nijmegen City Region (Question 31). In this hypothesis the independent variable is different

than the previous hypotheses. In hypothesis five the willingness to move to Arnhem Nijmegen City Region is the independent variable. A bivariate analysis will test this hypothesis.

#### *Duration of finding of an adequate job*

To test if there is a relationship between the duration of finding an adequate job and migration probability hypothesis 6 is drafted: *'Graduates who found their first job after graduation within three months live in Arnhem Nijmegen City Region more often than graduates who did not found a fitting job within three months within Arnhem Nijmegen City Region'*. In this hypothesis only graduates who lived in Arnhem Nijmegen City Region during graduation are selected. To test this hypothesis the duration of finding a fitting job (Question 38) and the current location of residence (Question 22) will be compared.

#### *Perception of working- and living environment in Arnhem Nijmegen City Region*

Hypothesis 7a is about the relationship between the perception of the working- and living environment in Arnhem Nijmegen City Region and the willingness to move to Arnhem Nijmegen City Region: *'Graduates with a positive perception of the working- and living environment in Arnhem Nijmegen City Region are more willing to move to the city region than graduates who have a negative perception of the working- and living environment in Arnhem Nijmegen City Region'*. In this hypothesis, again the willingness to move to Arnhem Nijmegen City Region is the independent variable (Question 31). The dependent variable which will be compared with this independent variable is the average valuation of the working- and living environment in Arnhem Nijmegen City Region (Question 45).

Hypothesis 7b is about the relationship between the perception of the working- and living environment in Arnhem Nijmegen City Region and the wish to leave Arnhem Nijmegen City Region: *'Graduates with a positive perception of the working- and living environment in Arnhem Nijmegen City Region less wish to leave the city region than graduates who have a negative perception of the working- and living environment in Arnhem Nijmegen City Region'*. In this hypotheses the independent variable is the wish to leave to Arnhem Nijmegen City Region (Question 34). The dependent variable is, again, the average valuation of the working- and living environment in Arnhem Nijmegen City Region (Question 45).

To prevent that the results are distorted, only people who actually want to move, have to move or are planning to move within 5 years (Question 27, answers 'yes definitely' and 'maybe') can answer question 31 and 34 about the willingness to move to or leave Arnhem Nijmegen City Region.

#### *Determinants perceptions of regional working- and living environment*

To determine if economic factors play a more important role than other factors in determining the graduates' perceptions of the regional working- and living environment in Arnhem Nijmegen City Region the eighth and final hypothesis will be tested in this research: *'Economic factors play a more important role in determining the graduates' perceptions of the regional working- and living environment of Arnhem Nijmegen City Region than other factors do'*. In this hypothesis the overall rating of the working- and living environment in Arnhem Nijmegen City Region (Question 45) is the dependent variable. The independent variables are 'economic factors' and 'non-economic factors' (Question 44), which are operationalized as two scales (Dutch translation written in brackets). This operationalization is based on a similar research in Ede/ Food Valley (van Egmond, 2013).

**Table 4.5: Division of economic and non-economic factors**

<i>Economic factors</i>	<i>Non-economic factors</i>
Employment rates (Werkgelegenheid)	Offers on housing market (Aanbod passende woonruimte)
Diversity of jobs and functions (diversiteit aan banen en functies)	Presence of nature (Aanwezigheid groen/ natuur)
Diversity of employers (Diversiteit aan werkgevers)	Social atmosphere (Sfeer/ gezelligheid)
The presence of interesting jobs with chances to get promoted (Aanwezigheid van interessante banen met kans op promotie)	Shopping facilities (Winkelvoorzieningen)
	Range of restaurants, cafes and hotels (Aanbod horeca)
	Range of events (Aanbod evenementen)
	Range of performing arts and museums (Aanbod podiumkunsten en musea)
	Recreational facilities (Recreatieve voorzieningen)
	Infrastructure public transport (infrastructuur openbaar vervoer)
	Infrastructure for cars (infrastructuur voor auto)
	Infrastructure for bikes (infrastructuur voor fiets)

Because several variables should be analyzed with a focus on the relationship between a dependent variable and two independent variables, a multiple regression analysis is an appropriate way to test the eighth hypothesis.

#### *Housing segments*

To make clear in what kind of housing segment the respondents live and which segments they prefer, it is necessary to make a clear distinction between the different segments. The distinction the researcher chose, is based on the distinction which is applied in Arnhem Nijmegen City Region and the national government (Rijksoverheid, 2012).

**Table 4.6 Operationalization of housing segments**

<b>Segment</b>	<b>Price range</b>
Social housing	Monthly rent up to 699 euro's
Expensive rent	Monthly rent of 699 euro's or more
Cheap owner-occupied property	172.000 or lower
Middle owner-occupied property	172.000- 265.000
Expensive owner-occupied property	265.000 or more

#### *Housing type*

It is also relevant to know in what kind of houses respondents live and which housing types they prefer. For the distinction between the different kind of housing types, the same distinction made by the national government (Rijksoverheid, 2012) is applied:

- Single-family dwelling
- Multi-storey dwelling
- Apartments
- Detached houses

#### *Residential environment*

The third and the last housing term which needs operationalization is residential environment. Just like the previous two terms, this one is also based on the distinction made by the national government (Rijksoverheid, 2012):

- Urban center
- Prewar urban
- Postwar urban
- Urban green (suburbs and Vinex-neighborhoods)
- Village center (villages and little cities)
- Village (small villages)
- Rural

This distinction is, however, not for everyone easy to interpret, since some of the categories are in some extend very similar. The researcher chose to bring back the number of categories to 5:

- Urban center
- Urban
- Urban green
- Village
- Rural

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#### 4.1.5 Description of the response

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In this paragraph the group of respondents will be described. In total 2544 graduates participated in the research. However, 88% of them filled in the whole survey, which makes the total usable response contain 2242 graduates.

##### *Age, gender, household composition*

Approximately 67 percent of the respondents is female and 33 percent is male. The average respondent is 33 year old. Fifty percent of the respondents has an age between 27 and 37. This means that 25% of the respondents is older than 37 and 25% younger than 27. Most respondents live in a two person household (40,3%) or a single person household (31,2%). About a quarter of the respondents has a family with young kids (24,5%) (Table 10).

**Table 4.7: Household composition respondents**

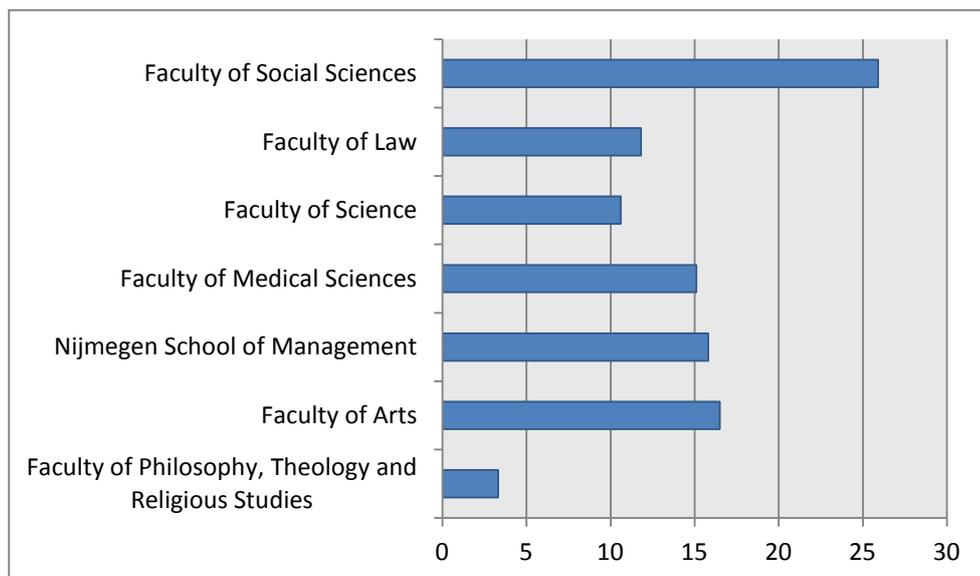
Household composition	Frequency	Percentage
Single person household	697	31,2
Two person household	901	40,3
Family with kid(s), including one or more younger than 12 years old	546	24,5
Family with kid(s) who are all older than 12 years old	55	2,5
Single parent with kid(s)	34	1,6
<b>Total</b>	<b>2233</b>	<b>100,0</b>

##### *Educational characteristics*

The major part of the respondents (2226) are master graduates of the Radboud University (99,3%). An almost negligible part of the respondents studied on the other two knowledge institutions in Arnhem Nijmegen City Region: the Hogeschool van Arnhem Nijmegen (0,1%) and the ArtEZ art academy (0,6%). This distribution is very uneven because the Hogeschool Arnhem Nijmegen did not give access to contact information of their graduates because of privacy reasons. The graduates of the ArtEZ art academy are approached via the LinkedIn alumni network, since this academy did not have a list of contact information of their graduates. Apparently, this way of approaching respondents is way less effective than a personal e-mail, since this group had 2656 members during the mailing. Because just a few respondents graduate on the Hogeschool Arnhem Nijmegen and the ArtEZ art academy, these respondents are excluded in this research.

**Figure 4.3: Distribution of respondents among the 6 faculties of the Radboud University (%)**

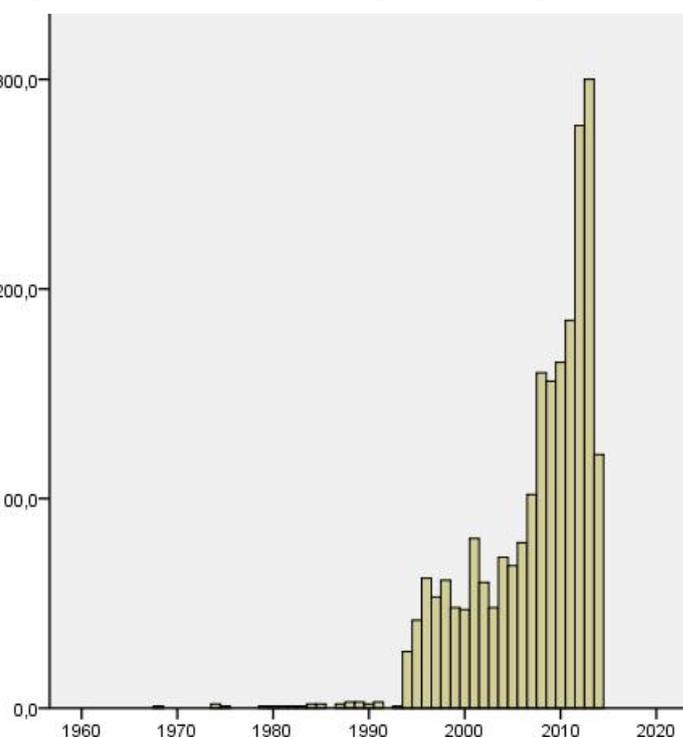
Figure 12 shows the distribution of the graduates among the different faculties of the Radboud University. The major part of the respondents did a study within the Faculty of Social Sciences (25,9%). Graduates within the Faculty of Arts (16,5%), Nijmegen School of Management (15,8%) and the Faculty of Medical Sciences (15,5%) are also strongly represented within the group of respondents.



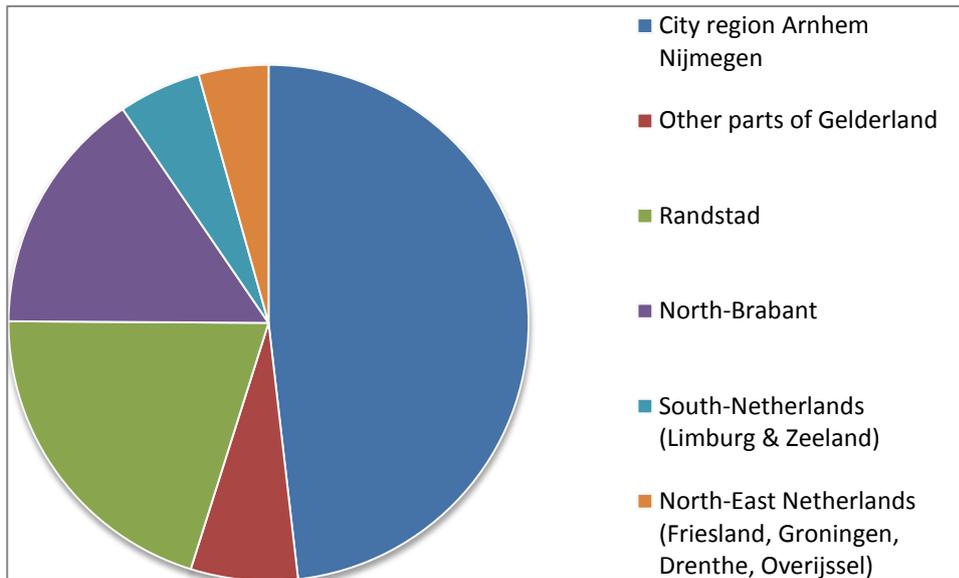
The most important motive the respondents have why they chose the Radboud University to study is because Nijmegen offers an attractive environment to study. Note that almost 32% of the respondents name this as one of the three reasons why they chose the Radboud University to do their studies. The fact that the Radboud University is the closest university which offers fitting education was for many also an important motive to choose the Radboud University to study (29%). Seventeen percent of the respondents also chose the Radboud University because they see the Radboud University as one of the best universities in the Netherlands. Eight percent of the respondents made this decision, because the Radboud University was the only university which offered the right educational programs. The fact that the Radboud University is situated on a knowledge campus was for many graduates of minor importance (1%).

A quarter of the respondents graduated before 2004. Fifty percent of the respondents graduated between 2004 and 2012. Another 25% of the respondents graduated between 2012 and 2014 (figure 13). It can be concluded that most respondents are graduated recently. A possible explanation for this is that graduated people who just graduated are more willing to participate in this research, since they recently did research themselves and feel more connected with the Radboud University than people who graduated longer ago.

**Figure 4.4: Distribution years of graduation respondents**



**Figure 4.5: Internship locations**



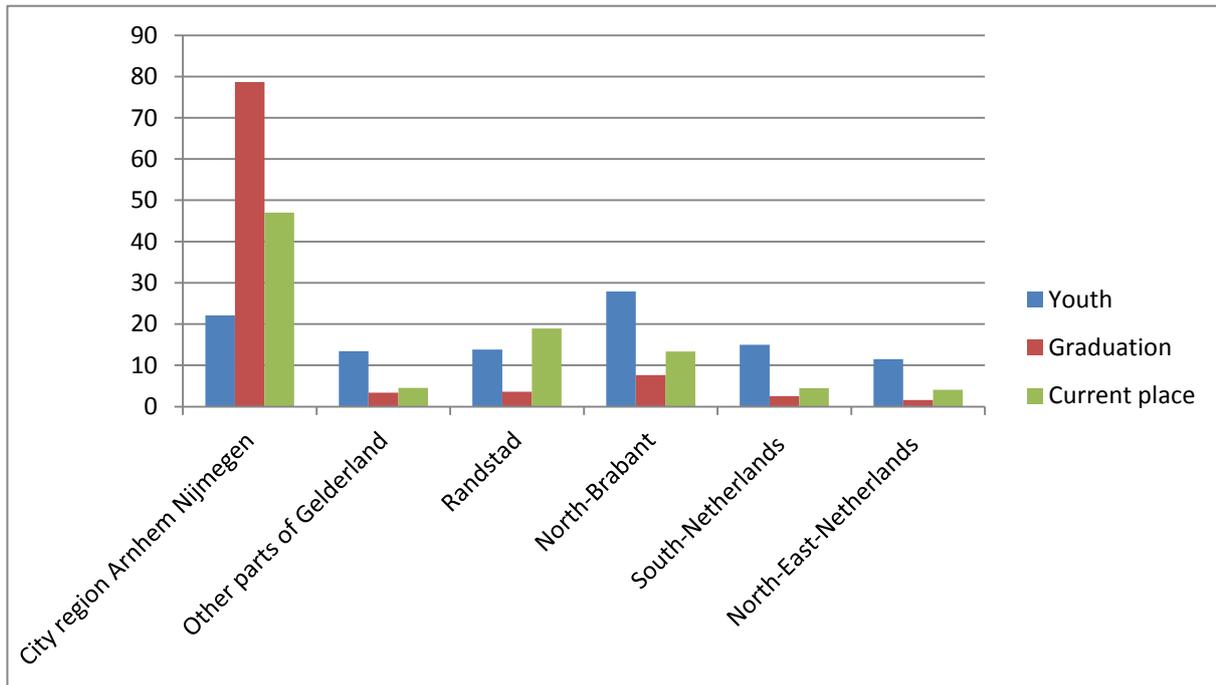
Of the 2226 graduates of the Radboud University 1572 did an internship during their studies. This is approximately 70,6% of the respondents. In figure 14 the place of their internships are visualized. Most of them (631) did their internship in Arnhem Nijmegen City Region (47,8 %). 20,1% percent did their internship in the Randstad region and 15,3% did an internship in the province of North-Brabant. 6,6% did an internship in other parts of the province of Gelderland (excl. Arnhem Nijmegen City Region). The remaining 9,4% did their internship in other parts of the Netherlands (North-East & South).

#### *Locations of residence*

In this research, the respondents is asked where they lived during the biggest part of their youth, during their graduation and where they currently live (figure 15). Many of the respondents lived during their youth in Arnhem Nijmegen City Region (22,1%). Most respondents, however, lived the major part of their youth in the province of North-Brabant (27,9%). 13,8% of them grew up in the Randstad region and 13,4% in other parts of the province of Gelderland. Fifteen percent lived in Limburg or Zeeland during their youth and 11,5% in the North-Eastern parts of the Netherlands.

During graduation the major part of the respondents lived in Arnhem Nijmegen City Region (78,7%). 7,6% of the respondents lived in the province of North-Brabant during graduation, while the remaining 11,1% of them lived elsewhere in the Netherlands during graduation. The convincing percentage for Arnhem Nijmegen City Region can be explained by examining the underlying motives why the graduates chose to live on a specific location during graduation. 54,5 % of the graduates name the proximity to the university as the most important reason why they lived on the place where they lived during graduation. 9,1% of the graduates name living independent as the main reason why they lived on the place where they lived during graduation, while 7,3% lived there because they lived with their parents or family.

**Figure 4.6: Place of residence during youth, graduation and current place of living (%)**

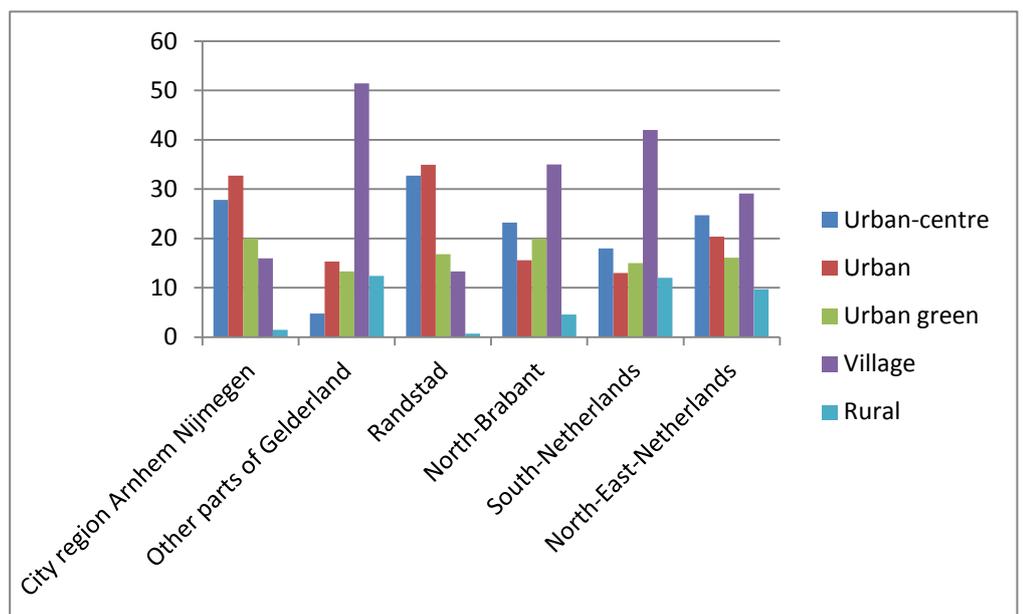


The pattern in which the graduates are currently distributed over the country differs from the distribution during graduation. Currently, most graduates still live in Arnhem Nijmegen City Region (47%). However, relatively many graduates currently in the Randstad region as well (18,9%). Another important part of the respondents live in the province of North-Brabant (13,4%), while other places within the province of Gelderland excluding Arnhem Nijmegen City Region (4,5%), the South of the Netherlands (4,4%) and the North-East of the Netherlands (4,1%) seem to be less popular regions to live for the graduates of the Radboud University.

*Housing characteristics*

This research distinguishes several residential environments as explained in the operationalization. Figure 16. shows the distribution of these residential environments within the six most important regions in this research. Note that there are big differences between the several regions when it comes to this distribution of residential environment. Respondents who live in Arnhem Nijmegen City Region mostly live in an urban environment

**Figure 4.7: Distribution of housing environment per area (%)**

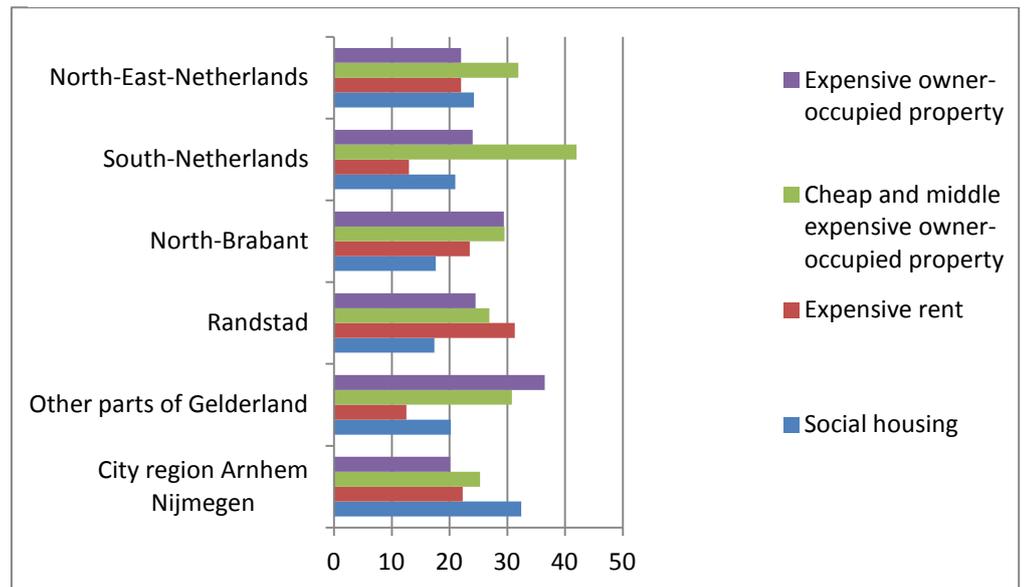


(32,7%) and a urban-centre environment (27,8%), just like the respondents who live in the Randstad (respectively 34,9% and 32,7%). Respondents who live in other parts of Gelderland clearly live in a more village environment (51,4%), just like respondents in the Southern parts of the Netherlands (42%). It is remarkable that just 1,5 % of the respondents who live in Arnhem Nijmegen City Region live in a rural environment, and 16% in a village environment, despite the fact that there are many rural areas within this region.

Besides housing environments, this research also distinguishes different housing segments, which are operationalized in the previous paragraph. When it comes to housing segments, the differences between the different regions are less obvious than when it comes to housing environments (figure 17). A remarkable fact, however, is that respondents who live in Arnhem Nijmegen City Region live relatively often (32,4%) in social housing compared to other regions.

Thereby, it is obvious that respondents who live elsewhere in the province of Gelderland live relatively more often (36,5%) in expensive owner-occupied properties than respondents in other regions. Respondents in the Southern parts of the Netherlands clearly live more often (42%) in cheap and middle expensive owner-occupied properties than other respondents.

**Figure 4.8: Distribution housing segments per region (%)**

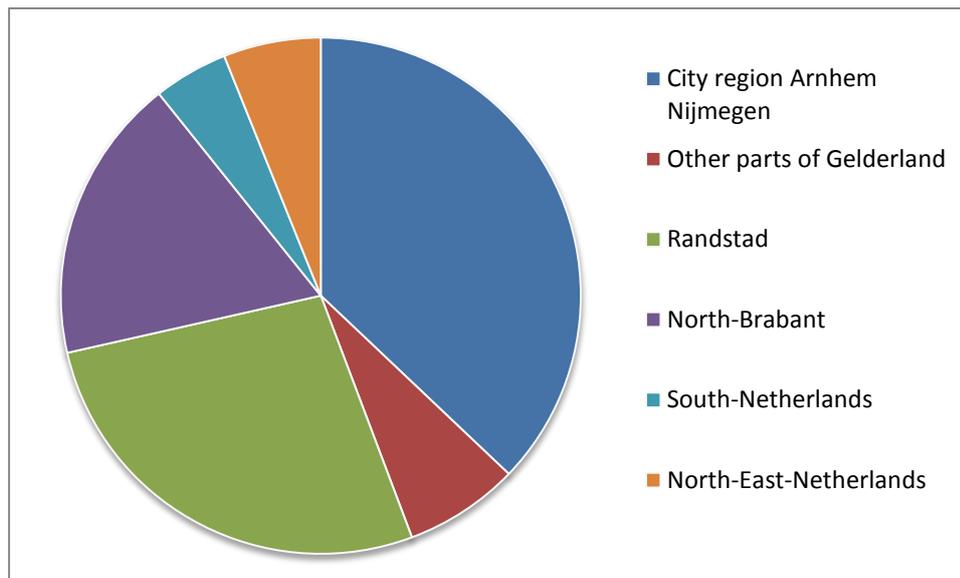


#### *Career characteristics*

The major part of the respondents (87,4%) has a paid job, 8,6% is unemployed and/or is looking for a job, 2% is a scholar or student, 1,4% incapable to work or retired and 0,7% is housewife or houseman. 47,2% of the working respondents has a permanent contract and 40,9 has a temporary contract. 11,8% of the respondents has a different kind of employment agreement.

Figure 18 shows how the current jobs are spatial distributed across the country. The major part of the respondents currently works in Arnhem Nijmegen City Region (36,8%). More than a quarter (26,9%) of the respondents works in the Randstad area, 17,7% in North-Brabant, 7,1% in Gelderland (excl. Arnhem Nijmegen City Region), 4,6% in the Southern Netherlands and 6% in the North-Eastern Netherlands.

**Figure 4.9: Spatial distribution of current jobs respondents**



#### 4.1.6 Representativeness of the sample

In total 2544 graduates participated in this research. 88% of them filled in the whole survey (2242 respondents). The other 12% who did not finish the survey are excluded in this research, because otherwise the results get distorted. The response in this research mainly contains out of graduates of the Radboud University (2226). Graduates of the Hogeschool van Arnhem Nijmegen (3) and the ArtEZ art academy (13) are because of difficulties around privacy or the lack of a list of the graduates' email-addresses way less represented. Therefore, these respondents are excluded in this research. This research focuses only on graduates of the Radboud University. Graduates of the Radboud University who graduated between 1994 and 2014 are approached to participate in this research.

By means of a sample information about the population is collected. However, the respondents' characteristics, as gender and study, can differ from the population's characteristics. This can be possible, since certain types of people are more tend to participate in a research than others. This analysis of representativeness compares the characteristics of the respondents with the characteristics of the population. The Radboud University provides specific data about the gender and the amount of students per faculty. Therefore, these data will be used in this analysis of representativeness (Radboud University, 2014).

**Table 4.8: Frequency distribution Faculty and Gender in population and response (%)**

		Population graduates (n=18183)	Response graduates (n=2226)
<b>Faculty</b>	Faculty of Philosophy, Theology and Religious Studies	2,7	3,3
	Faculty of Arts	13,5	16,7
	Nijmegen School of Management	17,6	16,0
	Faculty of Medical Sciences	17,0	15,3
	Faculty of Science	12,5	10,7
	Faculty of Law	13,3	11,9
	Faculty of Social Sciences	22,5	26,2
	Faculty Chi <sup>2</sup> = 48,963; p= 0,000		
<b>Gender</b>	Male	38	33
	Female	62	67
	Gender Chi <sup>2</sup> = 23,489; p= 0,000		

Source: Radboud University, 2014

Table 11 shows there are some differences between the population and the response when it comes to the distribution between the different faculties and between the two genders. The Chi-square goodness-of-fit test confirms this observation. According to the Chi-square goodness-of-fit test, the frequency distribution of the several faculties and gender in the response differs with the frequency distribution in the population (faculty  $\text{Chi}^2 = 48,963$ ;  $p = 0,000$ , gender  $\text{Chi}^2 = 23,489$ ;  $p = 0,000$ ). The response is, thus, not representative for all the graduates of the Radboud University who graduated between 1994 and 2014. For example, there are too many graduates who studied in the faculties of Art and Social Sciences represented in the sample and too few graduates who studied in the Faculty of Science. Furthermore, there are relatively too many woman represented in the sample compared to the whole population. This difference can possibly be explained by the fact that the compared information differs: the data about the whole population is about students and the response date is about graduates. Another explanation of the overrepresentation of some faculties can be that graduates with a certain educational background are more interested in the topic of this research than graduates with other educational backgrounds and therefore more willing to fill in the survey. Thereby, it is possible that woman are more tend to participate in a research than men.

The researcher chose not to weight the cases to balance the response the way in which the faculties and genders are distributed in the whole student population. This choice is seen as responsible, because it is expected that gender and faculty do not influence the graduates' choice of residence.

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#### 4.2 Qualitative research

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The qualitative part of this research aims to give more meaning to the quantitative outcomes. Thereby, this method will be used to answer the fourth sub question in this research: *In which ways can regional policy be optimized to create an attractive climate for settlement for graduates?* There will be some interviews with local governors, with key persons of local knowledge institutions and key persons of the local businesses to get a better understanding of the city region's climate for settlement for higher educated and about the role of the regional policymakers to retain these higher educated. This part of the research should help to draft some helpful recommendations for Arnhem Nijmegen City Region.

##### *Selection of respondents*

People from some various organizations and companies are interviewed. The researcher chose to approach companies which are related to one of the region's top sectors. He made this decision, since it is expected that there is a clear concentration of these kind of companies in the region and these companies will attract students and graduates to fulfill their demand for labor.

Hogeschool van Arnhem en Nijmegen (Noël Maertens)  
UMC St. Radboud (Theo Jacobs)  
Health Valley (Victor Haze)  
NXP (Johan Kluitmans)  
POA Liemers (Marc Samuels)  
Gemeente Nijmegen (Berrie Schattenberg & Marije Gerrist)  
Gemeente Arnhem (Ingelien Kroodsma)  
Stichting KiEMT (Harry de Vries)  
Radboud Career Service Science (Caroline Termaat-Douwes & Jan Willem Dijk )

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### *4.3 Conclusion*

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In this chapter the methodological base of this research is discussed. Both quantitative and qualitative methods are applied in order to answer the main question of this research. Important terms from the theory are operationalized and made measurable. Thereby, the representativeness of the sample is tested. Unfortunately, the sample is not representative for the whole population. The researcher chose, however, not to weight the cases since it is expected that the variables do not significantly correlate with the graduate's choice of residence. In the next chapter the results of this research will be presented.



## 5| Results quantitative research

### 5.1 Introduction

After the theoretical framework, the introduction of the case study in this research and the methodological design of this research, this chapter will discuss the empirical findings of this research. Hereby it will become clear whether or not Arnhem Nijmegen City Region succeeds in keeping graduates within the region after graduation. This chapter will therefore test the hypotheses which are outlined in paragraph 3.5.1.

### 5.2 Location choice graduates

Before the location choice of the current place of residence will be discussed, it is important to find out what the relationship is between the location of residence during youth and the location of residence during graduation. In this way it can be discovered in what extend the Arnhem Nijmegen City Region functions as a magnet towards students.

Twenty six percent of the respondents already lived in Arnhem Nijmegen City Region before starting their study. Another 13 percent of the respondents grew up in other parts of the province of Gelderland, 10 percent in the Randstad, 25 percent in North-Brabant and 27 percent in other regions within the Netherlands. Relatively many of the graduates (74 percent), thus, grew up outside the Arnhem Nijmegen City Region.

Table 5.1 describes the relationship between the location of residence during youth and the location of residence during graduation. The relationship between the two variables is moderate- strong (Cramer's  $V= 0,301$ ). The most striking outcome is the percentage of graduates who grew up in Arnhem Nijmegen City Region and still live there during graduation (92 percent). A possible explanation for this high percentage is that many people who grew up in Arnhem Nijmegen City Region chose a university close to the parental home which makes it unnecessary to move. Graduates who grew up outside Arnhem Nijmegen City Region live in most cases in Arnhem Nijmegen City Region during graduation. This indicates that Arnhem Nijmegen City Region obviously functions as a magnet for students.

**Table 5.1: Location of residence during graduation in proportion of location of residence during youth (%)**

Location of residence during graduation							
Location of residence during youth	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	92	2	4	2	1	100	(n=468)
Other parts of Gelderland	75	19	5	1	1	100	(n=282)
Randstad	77	1	19	1	1	100	(n=211)
North-Brabant	70	0	4	25	1	100	(n=583)
Other regions	80	1	3	2	14	100	(n=551)
<b>Total</b>	53	5	20	14	9	100	(n=2095)
$\chi^2= 760,287$ $p=0,000$ Cramer's $V= 0,301$							

Thereby it is interesting to get to know for what kind of students Arnhem Nijmegen City Region attracts. What kind of educational background do students have who come from far? Table 5.2 shows where students per faculty grew up. Only 22 percent of the students grew up within the region and therefore is already familiar with the region. Another 14 percent of the students grew up in other parts of Gelderland. The majority of the students, however, comes from North-

Brabant. Apparently the region –and Nijmegen in particular- is an appealing place to study. Despite the fact the relation between faculty and location during youth turns out to be statistically significant, it is hard to find faculty specific striking features. There are no faculties which specifically attract students from further away and others which mainly attract local students. The relationship between the two variables is, therefore, remarkably weak and has a Cramer's V value of 0,082.

**Table 5.2: Location during youth in proportion of faculties (%)**

Location during youth							
Faculty	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Faculty of philosophy, theology and religious sciences	23	16	17	20	24	100	(n=70)
Faculty of Arts	19	13	12	31	26	100	(n=353)
Nijmegen School of Management	26	14	14	22	24	100	(n=339)
Faculty of medical sciences	19	16	9	30	25	100	(n=332)
Faculty of science	27	11	8	30	25	100	(n=224)
Faculty of law	32	13	9	25	21	100	(n=255)
Faculty of social sciences	17	15	9	29	30	100	(n=541)
<b>Total</b>	22	14	11	28	26	100	(n=2114)
<i>X<sup>2</sup>= 57,152 p=0,000 Cramer's V= 0,082</i>							

Despite the fact the region is clearly a magnet for students from all kind of different regions, it remains to be seen whether Arnhem Nijmegen City Region succeeds in remaining these students after graduation. Following paragraphs will examine whether this is the case or not and what profile graduates have who stay and leave the Arnhem Nijmegen City Region after graduation.

### 5.2.1 Location during graduation and location choice of graduates

The first hypothesis is about the relationship between the location during graduation and the location of residence after the first movement of the graduates. This hypothesis aims to test whether Arnhem Nijmegen City Region can be considered to be an escalator region (Fielding, 1992) or not:

#### Hypothesis 1

Graduates who lived in Arnhem Nijmegen City Region during their graduation did leave their region of living more often after graduation compared to graduates who lived outside Arnhem Nijmegen City Region during their graduation.

To find out whether or not Arnhem Nijmegen City Region can be characterized as an escalator region, the graduates' location during graduation is compared with the graduates' location of residence after the first movement after graduation. Hypothesis 1 expects that graduates who lived in Arnhem Nijmegen City Region during graduation left their region more often than graduates who lived elsewhere during graduation.

More than half of the respondents (52 percent) lives in the same municipality as they did during graduation (table 5.3). The relation between location of residence during graduation and moving is statistically significant. This means that the location of residence during graduation is one of the explaining factors which determine whether the graduate moves or not. However, this relation is very weak (Cramer's V= 0,101). It is obvious that graduates who lived in Arnhem

Nijmegen City Region during graduation moved more often (50 percent) than graduates who lived elsewhere during graduation.

**Table 5.3: Movements in proportion to the location of residence during graduation (%)**

Moved after graduation?				
Location of residence during graduation	No	Yes	Total	
Arnhem Nijmegen City Region	50	50	100	(n=1712)
Other parts of Gelderland	66	34	100	(n=73)
Randstad	62	38	100	(n=117)
North-Brabant	58	42	100	(n=180)
Other regions	63	37	100	(n=92)
<b>Total</b>	52	48	100	(n=2174)

$\chi^2 = 22,157$   $p = 0,000$  Cramer's  $V = 0,101$

To make spatial patterns of the graduates who actually moved after graduation clearer, the location of residence during graduation and the location after the first movement after graduation are compared in table 5.4. There is a statistically significant relationship between these two variables. This means that location of residence during graduation is one of the factors which determine the location after the first move after graduation. However, this relationship is remarkably weak (Cramer's  $V = 0,134$ ).

It is remarkable that 39 percent of the respondents who moved after graduation and lived in Arnhem Nijmegen City Region moved to the Randstad region. A major part of the people who lived in this region during graduation moved to another municipality within Arnhem Nijmegen City Region (22 percent). Many of the respondents who lived in other parts of Gelderland during graduation moved towards Arnhem Nijmegen City Region after graduation (39 percent). People who lived in the Randstad during graduation mostly moved within this same region after graduation (71 percent). Sixteen percent of them moved to Arnhem Nijmegen City Region after graduation. 23 percent of the respondents who lived in North-Brabant during graduation moved to Arnhem Nijmegen City Region after graduation. Most of them, however, moved within North-Brabant (46 percent). For respondents who lived in other regions within the Netherlands during graduation, the Randstad region is a popular region to move to after graduation (32 percent). In total most respondents lived in the Randstad region after their first movement after graduation (39 percent). Twenty two percent of the respondents who moved after graduation moved towards a place within Arnhem Nijmegen City Region.

**Table 5.4: Location after first movement in proportion to the location of residence during graduation (%)**

Location after first movement after graduation							
Location of residence during graduation	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	22	6	39	18	15	100	(n=761)
Other parts of Gelderland	39	9	30	13	9	100	(n=23)
Randstad	16	0	71	8	5	100	(n=38)
North-Brabant	23	2	21	46	9	100	(n=66)
Other regions	16	3	32	13	36	100	(n=31)
<b>Total</b>	22	5	39	19	15	100	(n=919)

$\chi^2 = 66,045$   $p = 0,000$  Cramer's  $V = 0,134$

Besides the first place of living after graduation, it is interesting to compare the location of residence during graduation with the current location of residence. For this comparison, only the respondents who actually moved after graduation are selected (n=1042). The relationship between the location during graduation and the current location is statistically significant. The location of residence during graduation, thus, partly determines on which place the graduate currently lives. This relationship is moderate-strong (Cramer's V = 0,350).

Most respondents who lived in Arnhem Nijmegen City Region during graduation and moved after graduation, currently live in the Randstad region (table 5.5). However, many of them moved within the city region as well (31 percent). Most graduates who lived in the Randstad region during graduation moved within this same region (59 percent). A fifth of this group moved towards Arnhem Nijmegen City Region (21 percent). Graduates who lived in North-Brabant during graduation tend to move within the same region as well (51 percent). For this group of respondents the Randstad and Arnhem Nijmegen City Region have the same attraction, namely respectively 20 and 19 percent. Respondents in the more peripheral parts of the Netherlands (category 'Other regions') also tend to move within these regions (44 percent). In total the Randstad region is the most popular region to live among the group of respondents who moved after graduation (34 percent). Thirty percent of the respondents who moved after graduation currently lives in Arnhem Nijmegen City Region, which also can be considered as a considerable part.

**Table 5.5: Current location of residence in proportion to location of residence during graduation (%)**

Current location of residence							
Location of residence during graduation	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	31	5	34	17	12	100	(n=864)
Other parts of Gelderland	32	28	16	16	8	100	(n=25)
Randstad	21	0	59	11	9	100	(n=44)
North-Brabant	19	1	20	51	9	100	(n=75)
Other regions	12	3	27	15	44	100	(n=34)
<b>Total</b>	30	5	34	19	12	100	(n=1042)

$X^2 = 127,454$   $p = 0,000$  Cramer's  $V = 0,350$

If all respondents are included in the same comparison, the outcomes are remarkably different (table 5.6). In this comparison the respondents who did not move after graduation are also included. Again, the relationship between the location of residence during graduation and the current location of residence is statistically significant. This means that the location during graduation partly determines where the respondents currently live. However, in this case the relationship is strong (Cramer's V= 0,534).

It is obvious that most respondents who lived in Arnhem Nijmegen City Region during graduation still live in the same region (66 percent). Seventeen percent of this group moved to the Randstad region. Also respondents who lived in other regions during graduation currently live in the same region (Other parts of Gelderland (75%); Randstad (85%); North-Brabant (79%); Other regions (79%)). Respondents who lived in Arnhem Nijmegen City Region, thus, left their region the most compared to the other regions. However, it is the question if Arnhem Nijmegen City Region can be characterized as an escalator region, since 66 percent of the respondents who lived in this region during graduation still live in the city region.

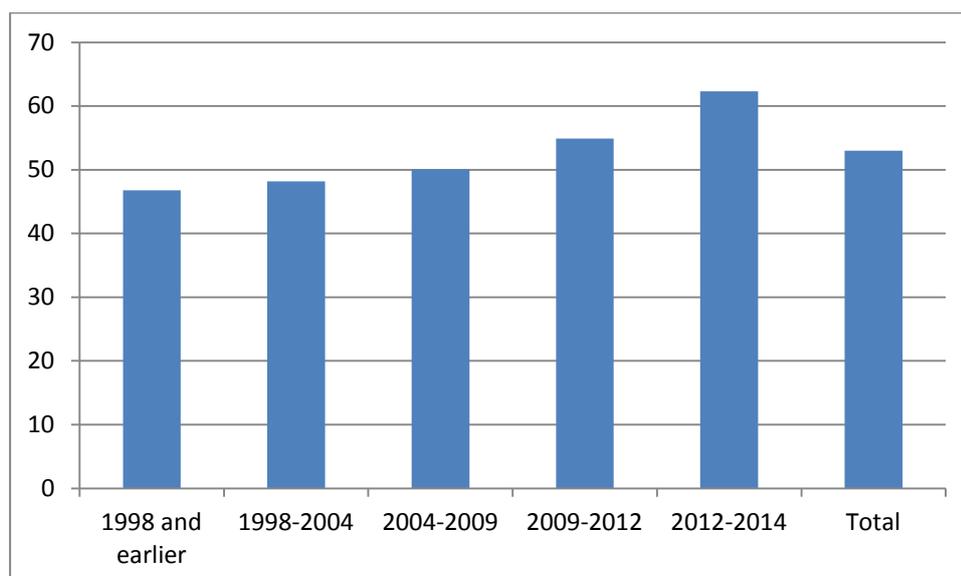
**Table 5.6: Current location of residence in proportion to location of residence during graduation (%), including all respondents**

Current location of residence							
Location of residence during graduation	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	66	3	17	9	6	100	(n=1712)
Other parts of Gelderland	11	75	6	6	3	100	(n=73)
Randstad	8	0	85	4	3	100	(n=117)
North-Brabant	8	1	8	79	4	100	(n=180)
Other regions	4	1	10	5	79	100	(n=92)
<b>Total</b>	54	5	20	14	9	100	(n=2174)
$\chi^2 = 2482,446$ $p = 0,000$ Cramer's $V = 0,534$							

Many recently graduated respondents did participate in this research. It is conceivable that many recently graduated respondents still live in the region of studying: Arnhem Nijmegen City Region. Therefore, it is possible that the outcomes of current location of residence strongly get influenced by the respondent's graduation year. It is therefore necessary to check if there are clear differences between recently graduated respondents and respondents who graduated longer ago.

Figure 5.1 shows there are barely any differences between different groups of graduation years. Forty seven percent of the respondents who graduated before 1998 and sixty two percent of the very recently graduated respondents (2012-2014) live in Arnhem Nijmegen City Region. The more recent the respondent graduated, the bigger the chance that respondents lives in Arnhem Nijmegen City Region. Recently graduated respondents live, thus, more often in the same area as during graduation. However, the differences are very small. Therefore, it can be concluded that year of graduation does not influence the current place of living considerably.

**Figure 5.1: Proportion of respondents who currently live in Arnhem Nijmegen City Region in proportion to graduation year groups (%)**



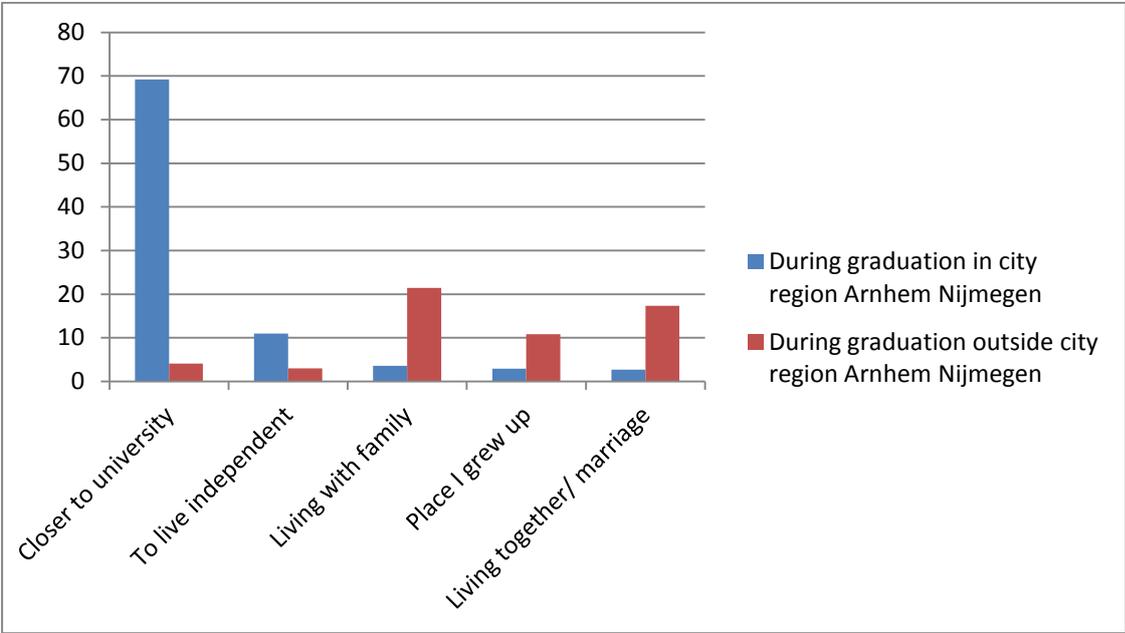
It can be concluded that the first hypothesis is statistically correct. There is a clear relationship between the graduate's location during graduation and the graduate's current location of

residence. And indeed, graduates who lived in Arnhem Nijmegen City Region during graduation moved more often to other regions compared to graduates who lived elsewhere during graduation. However, since 66 percent of the graduates who lived in Arnhem Nijmegen City Region during graduation still live in this region, it can be concluded that graduates are relatively rooted in the region of studying. It is therefore questionable to label Arnhem Nijmegen City Region as an escalator region in which people educate themselves and subsequently leave the region towards other regions.

*Motives location during year of graduation*

Which motives were, according to the graduates, determine the choose the place of living during graduation and after graduation? There are major differences between the motives which underlie the location choice during graduation of respondents who lived in Arnhem Nijmegen City Region and elsewhere (figure 5.2). For graduates who lived in Arnhem Nijmegen City Region during graduation, the proximity of the university is of major importance in determining the location choice. To live independent is the second most important reason to live in Arnhem Nijmegen City Region during graduation. The major importance of the university’s proximity in the location choice indicates that students from regions outside Arnhem Nijmegen City Region tend to move to the city region to shorten the distance between home and university. Graduates who did not live in Arnhem Nijmegen City Region during graduation, living with family is the most important motive for the location choice (22 percent). Other reasons why they did not live in Arnhem Nijmegen City Region during graduation are the fact they live together or are married (18%) or because they grew up there (12%). For respondents who lived outside Arnhem Nijmegen City Region, social reasons are of major importance, related to family, partners and bonds with the place they grew up.

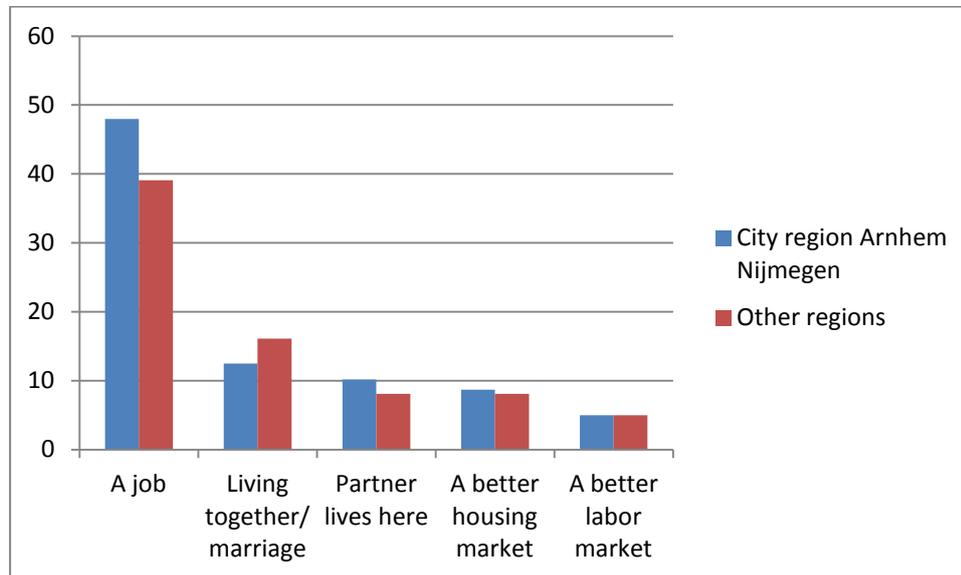
**Figure 5.2: Motives location choice during graduation in proportion to place of residence during graduation (%)**



Other motives play a role in determining the place of living after the first move after graduation (figure 5.3). In this case, the differences between respondents who live in Arnhem Nijmegen City Region and other regions is minimal. Career opportunities mostly seem to determine the location choice after graduation. Relational motives play an important role too; marriage, living together or the partner’s place of residence are important determinants of location choice

behavior. A better housing market and a better labor market are also named as important determinants.

**Figure 5.3: Motives location choice of first place after graduation in proportion to place of living (%)**



## 5.2.2 Location during youth and current location of residence

The second hypothesis is about the relationship between the location where the graduate grew up and the current location of residence. This hypothesis is based on the notion that familiarity with a region affects the direction of migration. Therefore, it is expected that relatively most people who lived in Arnhem Nijmegen City Region during their youth, currently live in this region too:

### Hypothesis 2

Graduates who lived in Arnhem Nijmegen City Region during the longest part of their youth live more often in Arnhem Nijmegen City Region than graduates who lived elsewhere during the longest part of their youth.

The relationship between location during youth and current location of residence is statistically significant. This means that the location where the graduate grew up partly determines the graduate's current place of living. The relationship can be considered as a temperate strong one (Cramer's  $V= 0,301$ ).

**Table 5.7: Current location of residence in proportion to location of residence during youth (%)**

Current location of residence							
Location of residence during youth	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	73	3	16	5	3	100	(n=470)
Other parts of Gelderland	51	20	20	5	5	100	(n=284)
Randstad	41	5	45	5	4	100	(n=213)
North-Brabant	46	1	15	36	2	100	(n=587)
Other regions	48	3	18	7	24	100	(n=558)
<b>Total</b>	53	5	20	14	9	100	(n=2112)
<i>X<sup>2</sup>= 766,147 p=0,000 Cramer's V= 0,301</i>							

It is very clear that respondents who grew up in Arnhem Nijmegen City Region relatively live more often in this same region (73 percent) compared to respondents who grew up elsewhere (table 5.7). However, approximately 50 percent of the respondents who grew up in other regions live in Arnhem Nijmegen City Region as well. This high percentage can be explained by the fact that they studied in Arnhem Nijmegen City Region and therefore have lived there and build up a bond with this region. Also respondents who grew up outside Arnhem Nijmegen City Region seem to be attracted by their home region, since major parts of them currently live in the same region as they did during their youth (Other parts of Gelderland:20%; Randstad: 45%; North-Brabant: 36%; Other regions: 24%). Therefore, familiarity with the region of origin indeed seems to influence the graduates' direction of migration.

### 5.2.3 Internship and current location

The third hypothesis state that location is related to the graduates' current location:

#### Hypothesis 3

Graduates who did an internship in Arnhem Nijmegen City Region during their study do live in Arnhem Nijmegen City Region more often than graduates who did not do an internship in Arnhem Nijmegen City Region during their study.

There is a statistically significant relationship between the location of internship and the current location of residence (table 5.8). The relationship between these two variables is weak (Cramer's V= 0,227). Graduates who did an internship in Arnhem Nijmegen City Region live in 64 percent of the cases in this same region. They live way less in other regions within the Netherlands (36 percent). Graduates who did their internship elsewhere in the Netherlands in many cases live in Arnhem Nijmegen City Region as well. Respondents who did their internship in the Randstad region, in North-Brabant and in 'Other regions' live relatively often in the region of their internship (respectively 37%, 32% and 34%). However, most of them live in Arnhem Nijmegen City Region (respectively 39%, 46% and 39%). Respondents who did their internship in parts of Gelderland outside Arnhem Nijmegen City Region did their internship relatively more often in other regions. Fifty two percent of them live in Arnhem Nijmegen City Region, 21% in the Randstad region and only 15% lives in the same region. Hypothesis 3a can be considered as correct, since graduates who did their internship in Arnhem Nijmegen City Region considerably live more often in this region than graduates who did their internship elsewhere.

**Table 5.8: Current location of residence in proportion to location of internship (%)**

Current location of residence							
Location of internship	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	64	4	14	13	6	100	(n=632)
Other parts of Gelderland	52	15	21	5	8	100	(n=88)
Randstad	39	3	37	13	8	100	(n=262)
North-Brabant	46	5	11	32	6	100	(n=202)
Other regions	39	4	11	12	34	100	(n=135)
<b>Total</b>	53	4	18	15	9	100	(n=1319)
$\chi^2 = 272,995$ $p = 0,000$ Cramer's $V = 0,227$							

### 5.2.4 Career and current place of living

Hypothesis 4 is about the location (4a) and the sector (4b) of the graduates' jobs and the influence of these factors on the current place of living:

#### Hypothesis 4a

Graduates who work in Arnhem Nijmegen City Region live in the city region more often than graduates who do not work in Arnhem Nijmegen City Region.

There is a strong and statistically significant relationship between the location of job and current location of residence (table 5.9; Cramer's  $V = 0,601$ ). Graduates who work in Arnhem Nijmegen City Region clearly live more often in the city region than other graduates. This relation applies not only on Arnhem Nijmegen City Region, but also on the Randstad region (73 percent), North-Brabant (56 percent) and other regions (65 percent). Graduates who work in other parts of the province of Gelderland, mostly live in Arnhem Nijmegen City Region (56 percent). This group is thus an exception compared to the other groups. However, it can be concluded that employment opportunities are an important factor in determining spatial behavior of skilled people. However, later on the relative influence of this factor will be discussed compared to other factors.

**Table 5.9: Current location of residence in proportion to location of job (%)**

Current location of residence							
Location of job	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Arnhem Nijmegen City Region	89	3	1	6	1	100	(n=661)
Other parts of Gelderland	56	29	5	5	5	100	(n=130)
Randstad	17	3	73	5	1	100	(n=484)
North-Brabant	37	1	1	56	5	100	(n=315)
Other regions	21	5	4	5	65	100	(n=207)
<b>Total</b>	50	5	21	14	9	100	(n=1797)
$\chi^2 = 2600,383$ $p = 0,000$ Cramer's $V = 0,601$							

It is also interesting to switch the two variables (table 5.10). When this is done, the job location is the independent variable instead of the current location of residence. Obviously, the relationship between the two variables stays statistically significant and strong. However, in this way it is easier to interpret in which region graduates work per location of residence. It is again, really clear there is a strong relationship between the two variables. In all cases, people work the most often in the same region as they live. This is the most applicable on the Randstad region, because no less than 93 percent of the respondents who live in this region also work here. Also for 'other regions' (80 percent) and North-Brabant (69 percent) this relationship is really strong. Respondents who live in Gelderland outside Arnhem Nijmegen City Region work the least in the same region as they live compared to other respondents. Still, 44 percent of them work in the same region as they live. Twenty three percent of this group works in Arnhem Nijmegen City Region. This is understandable, since Arnhem Nijmegen City Region is the most important 'employer' of the province of Gelderland, since Arnhem and Nijmegen are the two biggest urban regions of the province. It is also remarkable that residents of Arnhem Nijmegen City Region relatively work more often in other regions than most other respondents (except other parts of Gelderland). Sixty five percent of the respondents who live in this region work in this same region too, which is considerably less than, for example, residents of the Randstad region and 'other regions'. This means that Arnhem Nijmegen could rather be considered as a living region than a working region. After all, whereas 47 percent of the respondents live in this region, just 37 percent works in this region. The Randstad region, for example, is rather an area to work, since just 19 percent of the respondents live in this region, while 27 percent works in this region.

**Table 5.10 : Location of job in proportion to current location of residence (%)**

Current location of residence	Location of job					Total	
	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions		
Arnhem Nijmegen City Region	65	8	9	13	5	100	(n=661)
Other parts of Gelderland	23	44	18	3	12	100	(n=130)
Randstad	2	2	93	1	2	100	(n=484)
North-Brabant	15	2	10	69	4	100	(n=315)
Other regions	5	4	3	9	80	100	(n=207)
<b>Total</b>	37	7	27	18	12	100	(n=1797)

$X^2= 2600,383$   $p=0,000$  Cramer's  $V= 0,601$

Hypothesis 4b is about the relationship between the job's sector and the current place of living:

#### Hypothesis 4b

Graduates with a job which relates to the region's top sectors relatively do live in Arnhem Nijmegen City Region more often than graduates who have a job which is not related to the region's top sectors.

In hypothesis 4b the current location of residence is compared with the job's sector (table 5.11). Since just 269 of the respondents work within the region's four top sectors, the researcher chose to make two categories: work related to the region's top sectors and work not related to the region's top sectors. According to the Chi<sup>2</sup>- test the relationship between the two variables is significant. However, this relationship is remarkably weak (Cramer's  $V= 0,071$ ).

**Table 5.11: Current location of residence in proportion to job sector (%)**

Current location of residence							
Work related to the region's top sectors?	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
Yes	61	3	17	10	9	100	(n=269)
No	52	5	20	15	9	100	(n=1926)
<b>Total</b>	53	5	20	14	9	100	(n=2195)
$X^2= 11, 079$ $p=0,026$ $Cramer's V= 0,071$							

Indeed, there are little differences between respondents who do and do not work in the region's four top sectors when it comes to current location of residence. However, respondents who have a job which is related to the region's top sectors relatively live more often in Arnhem Nijmegen City Region (61 percent) compared to the respondents who work in other sectors (52 percent). It can be concluded that a job in the region's top sector does slightly influence the location choice of graduates. A job which is related to the region's top sectors is therefore a factor which bonds the graduates to the region. However, in paragraph 5.2.11 it will be tested if this weak determinant still is a factor of importance when other determinants are taken into account as well.

### 5.2.5 Year of graduation and willingness to move to Arnhem Nijmegen City Region

All kinds of factors influence the willingness whether a graduate is willing to move to Arnhem Nijmegen City Region or not. It is expected that more recently graduated respondents are less attracted to Arnhem Nijmegen City Region than the graduates who graduated longer ago. This is expected, since according to Verhost et al. (2011a) state that recently graduated graduates are very much focused on the Randstad region and that they used the more peripheral regions as escalator. Later on, when they 'hop off' the escalator, they tend to move (back) to regions which offer green facilities and space, since these regions are more attractive to raise children than the urbanized Randstad. The fifth hypothesis focuses on the willingness of graduates who live outside Arnhem Nijmegen City Region to move to this region. Therefore, 1333 respondents are excluded from this specific analysis. Since the respondents did mostly graduate between 1994 and 2014, the researcher chose to use the middle as the threshold: 2004. The fifth hypothesis is:

#### Hypothesis 5

Graduates who graduated before 2004 are more willing to move to Arnhem Nijmegen City Region than graduates who graduated after 2004.

The relationship between the year of graduation and the willingness to move to Arnhem Nijmegen City Region is statistically not significant (table 5.12). Hypothesis 5 gets not supported by the results in this research. Graduates who graduated longer ago, thus, are not more willing to move to Arnhem Nijmegen City Region than more recently graduated graduates. The differences between the recently graduated respondents and the ones who graduated earlier are very small. Thereby, it is clear that most graduates do not want to move to Arnhem Nijmegen City Region (40 percent). Another 35 percent of them probably wants to move to the city region and only 25 percent is willing to move to Arnhem Nijmegen City Region.

**Table 5.12: Willingness to move to Arnhem Nijmegen City Region in proportion to graduation year (%)**

Willingness to move to Arnhem Nijmegen City Region					
Years of graduation	Yes	Maybe	No	Total	
Before 2004	26	30	44	100	(n= 229)
2004-2014	24	37	38	100	(n= 680)
<b>Total</b>	25	35	40	100	(n=909)

$X^2= 4,620$   $p=0,099$

To test if the year of graduation influences the perception on the working- and living environment in Arnhem Nijmegen City Region, a non-parametric test is done: the Kruskal-Wallis test (table 5.13). The Kruskal-Wallis test tests whether samples originate from the same distribution. It is thus used to test whether the distributions in years of graduations are the same or differ from each other. Here fore, the respondents' rating of Arnhem Nijmegen City Region as working and living area is compared with the years of graduation.

The model is statically not significant ( $p=0,734$ ). The null hypothesis which states that the distributions are identical, gets not rejected. The common rating of the working and living environment in Arnhem Nijmegen City Region is equal between the different groups of graduation years. This means that the most recently graduated respondents do not rank the working and living environment in Arnhem Nijmegen City Region higher or lower than respondents who graduated longer ago.

**Table 5.13: Number of respondents, mean rank and test statistics (Kruskal-Wallis)**

	Years of graduation	N	Mean Rank
Common rating working and living environment Arnhem Nijmegen City Region	Before 2004	229	464,84
	2004-2014	609	458,39
	<b>Total</b>	919	

$X^2= 0,116$   $p= 0,734$

## 5.2.6 Search for a job and current location of residence

The sixth hypothesis is about the relationship between the length of time needed to find the first job and the current place of living. It is expected that graduates who found their first job within three months live more often in Arnhem Nijmegen City Region than graduates who needed more time to find a first job:

### Hypothesis 6

Graduates who found their first job after graduation within three months after graduation live more often in Arnhem Nijmegen City Region than graduates who did not found a fitting job within three months within Arnhem Nijmegen City Region.

In this analysis respondents who did not live in Arnhem Nijmegen City Region during graduation are excluded, since the hypothesis assumes that graduates stay in the region of studying if they find a job quickly after graduation. Thereby, only respondents who did not find a job after graduation are excluded from this analysis. Therefore, 2048 respondents take part of this analysis. With a  $X^2$  value of 6,524 the relationship between the time needed to find the first job and the current location of residence is not statistically significant.

It is remarkable that there are barely any differences in place of living between graduates who found a job within 3 months and graduates who needed more time to find the first job (table 5.14). This counts for all regions. Therefore, it is understandable there is no statistical significant relationship between the two variables. Finding a job quickly after graduation, thus, does not seem to influence the graduates' location choice of living. For

example, someone who finds a job directly after graduation does not stay more often in Arnhem Nijmegen City Region than graduates who needed more time to find a job. Therefore, it seems unnecessary to pay attention to a quick transition between study and labor market in the framework of the aim to keep higher educated in the region.

**Table 5.14: Current location of residence in proportion to the time needed to find first job (%)**

Current location of residence							
Time needed to find first job	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions	Total	
0-3 months	53	5	20	14	9	100	(n= 1583)
3-6 months	53	5	23	10	10	100	(n= 270)
7 months or longer	48	5	21	17	10	100	(n= 195)
<b>Total</b>	52	5	20	14	9	100	(n=2096)
<i>X<sup>2</sup>= 6,524 p= 0,589</i>							

### 5.2.7 Perception and willingness to move to Arnhem Nijmegen City Region

To research the relationship between the perception graduates have of the working and living environment in Arnhem Nijmegen City Region and the willingness to move to this region, low and high report marks will be compared with the willingness to move to Arnhem Nijmegen City Region:

#### Hypothesis 7a

Graduates with a positive perception of the working- and living environment in Arnhem Nijmegen City Region are more willing to move to the city region than graduates who have a negative perception of the working- and living environment in Arnhem Nijmegen City Region.

Just 909 respondents take part in this test, since the respondents who live in Arnhem Nijmegen City Region and respondents who answered 'I don't know' are excluded in this analysis. Thereby, respondents who are definitely not planning to move within five years did not have to answer the question about the willingness to move to Arnhem Nijmegen City Region.

The relationship between positive or negative report marks of the working and living environment in Arnhem Nijmegen City Region and the willingness to move to this region is according to the Chi<sup>2</sup> -test statistically significant (table 5.15). This relationship is, however, weak. Nevertheless, hypothesis 7a gets supported by the outcomes.

The majority of the respondents who do not live in Arnhem Nijmegen City Region and give a low ranking to the working and living environment this region offers are not willing to move to Arnhem Nijmegen City Region (65 percent). Just 13 percent of them is, despite the low ranking, willing to move to the city region. A remarkable outcome is that respondents who give a high ranking are in more cases not willing to move to the city region (34 percent) than they are willing to move to the city region (27 percent). Most of doubt if they want to move to Arnhem Nijmegen City Region (39 percent). Thus, a positive perception of the working and living environment in Arnhem Nijmegen City Region is not enough to actually move to the city region. Probably, other factors play a role.

**Table 5.15: Willingness to move to Arnhem Nijmegen City Region in proportion to report marks (%)**

Willingness to move to Arnhem Nijmegen City Region					
Report mark Arnhem Nijmegen City Region	Yes	Maybe	No	Total	
Low (1 until 5)	13	23	65	100	(n= 173)
High (6 until 9)	27	39	34	100	(n= 736)
<b>Total</b>	25	35	40	100	(n= 909)
$X^2 = 55,261$ $p = 0,000$ $Cramer's V = 0,247$					

To test if there is correlation between the rating of Arnhem Nijmegen City Region and the willingness to move to this region, there will be another statistical test: a Spearman's rank correlation (table 5.16). The researcher chose to do this, because the willingness to move to the city region is a ordinal variable, whereby there is a ranking of categories of high, average and low willingness to move to the city region. The report marks of the working and living environment is an interval-ratio variable.

There is a statistically significant correlation between the rating of Arnhem Nijmegen City Region and the willingness to move to this region (Sig. = 0,000). The correlation is moderate strong and positive: the higher the report marks for the working and living environment of Arnhem Nijmegen City Region, the more willing the respondent is to move to Arnhem Nijmegen City Region. This outcome confirms the result of the Chi<sup>2</sup>-test which is done before (table 5.15) and complements it.

**Table 5.16: Correlation matrix report marks and willingness to move (Spearman's rank correlation)**

	Willingness to move	Report marks
Willingness to move	1 (n= 2195)	0,279** (n=889)
Report marks		1 (n= 909)
** correlation is significant at the 0.01 level (2-tailed)		

### *Motives willingness to move to Arnhem Nijmegen City Region*

A major part of the graduates who do not live in Arnhem Nijmegen City Region is (maybe) willing to move to Arnhem Nijmegen City Region (60 percent). This respondents is asked why they are willing to move to this region. What are the reasons why these respondents are (maybe) willing to move to Arnhem Nijmegen City Region? These reasons, obviously, differ quite a lot. To find out what the most frequently mentioned motives are, there is made a wordle (wordle.net) to visualize the most common motives. The bigger and bolder the words are, the more common they are mentioned by the respondents. Since the survey was in Dutch, the wordle shows Dutch words.

Respondents mention often they would go to Arnhem Nijmegen City Region if there would be better employment chances in this region (figure 5.4). Another important reason is the (green) environment in the region, which offers an attractive place to live. The proximity of friends and family is also an important motive why graduates are willing to move to Arnhem Nijmegen City Region. A few typical and often mentioned answers:

*'My friends live there, it is a really nice city (Nijmegen) which is growing. More restaurants, activities and concerts etcetera. The only problem is the labor market' (Respondent number 1985).*



Figure 5.5: Motives not to move to Arnhem Nijmegen City Region



Source: Own creation (Wordle.net)

### 5.2.8 Perception and wish to stay in Arnhem Nijmegen City Region

In addition to hypothesis 7a it can be expected that graduates who value the working- and living environment in Arnhem Nijmegen City Region less wish to leave the city region than graduates who do not value the working- and living environment in Arnhem Nijmegen City Region:

#### Hypothesis 7b

Graduates with a positive perception of the working- and living environment in Arnhem Nijmegen City Region less wish to leave the city region than graduates who have a negative perception of the working- and living environment in Arnhem Nijmegen City Region.

813 respondents take part in this test, since respondents who do not live in in Arnhem Nijmegen City Region and respondents who answered 'I don't know' are excluded in this analysis. Thereby, respondents who are definitely not planning to move within five years did not have to answer the question about the willingness to move to Arnhem Nijmegen City Region.

The relationship between positive or negative report marks of the working and living environment in Arnhem Nijmegen City Region and the wish to leave this region is according to the Chi<sup>2</sup>-test statistically significant (table 5.17). However, this relationship could be considered as a weak relationship (Cramer's V= 0,199). Nevertheless, hypothesis 7b gets, just as the previous hypothesis, supported by the outcomes.

First it is remarkable that considerably few respondents (64) give a low report mark to the living and working environment in Arnhem Nijmegen City Region. Thirty nine percent of this group has the wish to leave Arnhem Nijmegen City Region, 47 percent considers to do this and 14 percent do, despite the low ranking, not have the wish to leave the city region. Respondents who give a high ranking have considerably less the wish to leave the city region (13 percent). The majority of this group considers to leave the city region and 29 percent of them do not want to leave the city region. Most respondents (56 percent), thus, keep the options open and are not spatially tied to the city region. 29 percent of the respondents want to stay in the city region and just 15 percent really has the wish to leave the city region.

**Table 5.17: Wish to leave Arnhem Nijmegen City Region in proportion to report marks (%)**

Wish to leave Arnhem Nijmegen City Region					
Report mark Arnhem Nijmegen City Region	Yes	Maybe	No	Total	
Low (1 until 5)	39	47	14	100	(n= 64)
High (6 until 9)	13	57	30	100	(n= 749)
<b>Total</b>	15	56	29	100	(n= 813)
$X^2 = 32,077$ $p = 0,000$ $Cramer's V = 0,199$					

Just as in hypothesis 7a, the Spearman's rank correlation test will test if there is a correlation between the rating of Arnhem Nijmegen City Region and the wish to leave this region. In this case there is no statistical significant correlation (Sig. = 0,054). The outcome of this test does not confirm the result of the Chi<sup>2</sup> -test. However, the statistical significant outcome of the Chi<sup>2</sup> -test turned out to be quite weak as well.

*Motives to leave or to stay in Arnhem Nijmegen City Region*

Just like the graduates who do not live in Arnhem Nijmegen City Region is asked why they do or do not want to move to Arnhem Nijmegen City Region, the graduates who do live in this region is asked why they do or do not want to stay in the region Arnhem Nijmegen (figure 5.6). Seventy one percent of the respondents (maybe) wants to leave the city region. Jobs and career opportunities are obviously the most important motives to leave Arnhem Nijmegen City Region. Apparently there is a lack of fitting job opportunities in the region which makes it for many attractive to move to elsewhere. Other, less important motives are the location of the respondents' partners and family.

*'I would like to leave the region, since the labor market in Arnhem Nijmegen City Region does not offer any opportunities for highly educated people' (Respondent nr. 2096).*

*'In this region there is no 'young professional culture' as in the Randstad' (Respondent nr. 1398).*

**Figure 5.6: Motives to leave the Arnhem Nijmegen City Region**

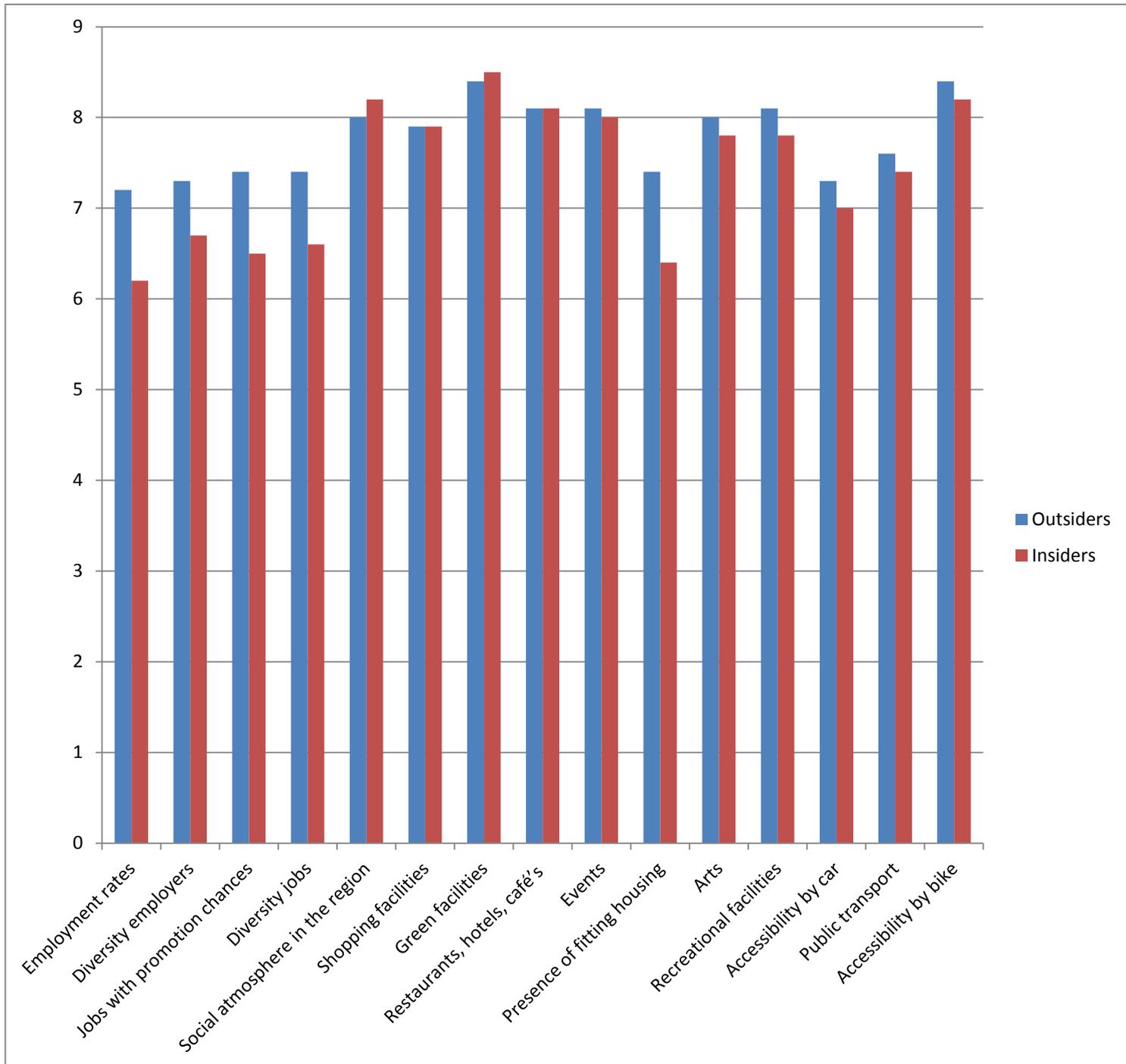


Source: Own creation (Wordle.net)



market (6,4) than the way outsiders perceive the housing market in Arnhem Nijmegen City Region (7,4). Paragraph 5.3 will further emphasize on this theme. In the same line with other outcomes in this research, green facilities get the highest rate of all characteristics (average of 8,4).

**Figure 5.8: Grades regional characteristics insiders and outsiders**



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### 5.2.10 Economic factors and amenities

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The last and eighth hypothesis is about the importance of economic factors in determining the graduates' perceptions of the regional working and living environment in Arnhem Nijmegen City Region:

#### Hypothesis 8

Economic factors play a more important role in determining the graduates' perception of the regional working- and living environment of Arnhem Nijmegen City Region than other factors do.

By using multiple regression the influence per factor can be detected. In common the model is not strong, since the R square has a value of 0,183. This means that just 18% of the variance in the rating of the working and living environment in Arnhem Nijmegen City Region is explained by the factors which are used in the model. The other 82% of the variance is explained by factors which are not included in this analysis. The ANOVA variance-analysis clarifies that with a 99% certainty it can be concluded that the overall model is significant. The fact that the whole model is significant, does not mean each individual factor significantly contributes to the explanation of the variance of the overall rating of the working and living environment in Arnhem Nijmegen City Region.

It can be concluded that the variables 'diversity of jobs', 'green facilities', 'events', 'presence of fitting housing', 'arts', 'accessibility by car' and 'accessibility by bike' do not significantly contribute to the explanation of the variance of the overall rating of the working and living environment in Arnhem Nijmegen City Region (table 5.18).

The remaining eight factors, however, do significantly contribute to the explanation of the variance of the overall rating of the working and living environment in Arnhem Nijmegen City Region. The social atmosphere in the region is the most influencing factor with a standardized Beta Coefficient of 0,28. 12,5 percent of the variance in the overall rating of the working and living environment in Arnhem Nijmegen City Region is explained by the valuation of the social atmosphere in the region. A possible explanation of this is that many graduates lived or still live in Arnhem Nijmegen City Region and build up a social network which makes them socially attached to the city region. The second most important factor is the presence of interesting jobs. However, this factor explains 4 percent of the variance of the overall rating of the working and living environment in Arnhem Nijmegen City Region. This factor is, therefore, way less important than the social atmosphere in the region.

A remarkable outcome is that recreational facilities and the presence of restaurants, hotels and cafés have a statistically significant negative influence on the variance of the overall rating of the working and living environment in Arnhem Nijmegen City Region. Thus, the higher the rating of the recreational facilities and the presence of restaurants, hotels and café's in Arnhem Nijmegen City Region, the lower the valuation of the overall the working and living environment in Arnhem Nijmegen City Region. It is hard to give an explanation for this remarkable outcome.

Overall, non-economic factors prove to be of bigger importance explaining the overall valuation of the working and living environment in Arnhem Nijmegen City Region than economic factors. Therefore, the eighth hypothesis gets rejected. It must be mentioned, however, that this model is just able to explain 18 percent of the variance. The remaining 82 percent could include many economic factors which are not taken into account in this analysis.

**Table 5.18: ANOVA variance-analysis of economic and non-economic determinants of overall rating working and living environment of Arnhem Nijmegen City Region**

	Total sample (n= 2195)
Social atmosphere in the region	0,28**
Presence of interesting jobs with chances of promotion	0,10**
Public transport	0,09**
Recreational facilities	-0,11**
Diversity of employers	0,07**
Shopping facilities	0,08**
Restaurants, hotels, caf�es	-0,06*
Employment rates	0,06*
Diversity of jobs	-
Green facilities	-
Events	-
Presence of fitting housing	-
Arts	-
Accessibility by car	-
Accessibility by bike	-

\*\* Statistically significant at the 0,05-level  
\* Statistically significant at the 0,10-level  
- Not statistically significant

### 5.2.11 What influences the location choice of graduates?

In this paragraph a multivariate logistic regression analysis will clarify which factors are important in explaining the location choice of graduates. Herewith, the influence of a certain factor on the chance to live in Arnhem Nijmegen City Region can be determined, whereby other influencing factors are taken into account as well. Because of the fact the dependent variable, the location of residence after graduation, has two options (Arnhem Nijmegen City Region or elsewhere) a logistical regression is fulfilled. At the end of this paragraph a formula will be presented which can be used to calculate the chance someone lives in Arnhem Nijmegen City Region. Subsequently, this formula will be filled in for two imaginary graduates with exactly the same characteristics, except for one. In this way the influence of one single characteristic can be shown. Table 5.19 presents the dependent and then independent variables of the analysis and the used measuring scales.

**Table 5.19: Variables in the logistical regression model**

	Variables	Measuring scale
<b>Dependent variable:</b>	Current location of residence	Dummy 0-1 (Elsewhere- Arnhem Nijmegen City Region)
<b>Independent variables:</b>	Gender	Dummy 0-1 (Man- Woman)
	Age	Interval/ratio (.....)
	Household composition	Dummy 0-1 (No family- family)
	Year of graduation	Interval/ratio (...)
	Rating working and living environment city region	Dummy 0-1 (High- Low)
	Location during youth	Dummy 0-1 (Elsewhere- Arnhem Nijmegen City Region)
	Location during graduation	Dummy 0-1 (Elsewhere- Arnhem Nijmegen City Region)
	Job location	Dummy 0-1 (Elsewhere- Arnhem Nijmegen City Region)
	Sector work	Dummy 0-1 (Top sector- not top sector)
	Internship location	Dummy 0-1 (Elsewhere- Arnhem Nijmegen City Region)

Which factors are the most important in determining the location choice after graduation? This model tests the influence of each factor on the chance to live in Arnhem Nijmegen City Region. The overall regression model is statistically significant (p=0,000) (table 5.20). In total, this

analysis is based on 2232 respondents. The Nagelkerke  $R^2$  is 0,529, which indicates that the logistical regression model has a high quality.

**Table 5.20: Coefficients logistic regression analysis (Arnhem Nijmegen City Region/ Elsewhere)**

<b>Dependent variable</b>			
Current location of residence (n= 2232)			
<b>Independent variables</b>	<b>B</b>	<b>Wald</b>	<b>P (sig.)</b>
(Contstant)	-2,789	-	-
Gender	-.375	9,820	.002*
Age	.000	.001	.979
Household composition	-.108	.592	.442
Year of graduation	-.038	13,804	.000*
Rating working and living environment city region	-.642	14,667	.000*
Location during youth	.819	34,545	.000*
Location during graduation	3,227	259,669	.000*
Job location	2,586	259,699	.000*
Sector work	-.054	.097	.755
Internship location	.149	1,434	.231

Model: p= 0,000; df= 10; Nagelkerke  $R^2= 0,529$ ; \*sig.  $\alpha < 0,05$

The factors which influence the graduates' location choice after graduation are (with a certainty of 95 percent) gender, graduation year, the rating of the working and living environment of the city region, the location during youth, location during graduation and job location. The job location is the most influencing factor, since it's Wald value is the highest (259,699). The job location, thus, determines the most on which location the graduate currently lives. Indeed, in paragraph 5.2.4 job location proved to be strongly related to current place of living. Therefore, this logistic regression confirms this finding.

The location during graduation is almost equally important as the job location. The Wald value of this factor is namely 259,669. This confirms the findings in paragraph 5.2.1: there is a strong relationship between location during graduation and current location. Graduates obviously tend to get attached to the region they studied and therefore are inclined to stay in the same region after graduation.

Hypothesis 3a runs as follows: 'graduates who did an internship in Arnhem Nijmegen City Region during their study do live in Arnhem Nijmegen City Region more often than graduates who did not do an internship in Arnhem Nijmegen City Region during their study'. In paragraph 5.2.3 it is concluded that internship location has a significant influence on the location choice of graduates. However, according to the logistic regression analysis, the location of an internship does not have a statistically significant influence on the location choice of graduates (p=0,231).

Contrary to hypothesis 4a, which is strongly supported, hypothesis 4b just nearly gets accepted in paragraph 5.2.4. The relationship between the job's sector and the current place of living is statistically significant, but very weak. In the logistic regression analysis, this variable is not statistically significant (p=0,755). In this perspective, the graduate's job's sector does not seem to influence the location choice of the graduate.

The location during youth proves, again, to be an important determinant of location choice (Wald= 34,545). Also the rating of the working and living environment in Arnhem Nijmegen City Region (Wald=14,667) and graduation year (Wald=13,804) are factors which influence the chance of living in Arnhem Nijmegen City Region.

It can be concluded that the chance of living in Arnhem Nijmegen City Region clearly increases when a graduate lived in this same region during graduation and when he or she works in this region. Other factors play a role too, but way less than these two factors. The regression equation runs as follows:

$$\text{[Current location of residence]} = -2,789 - 0,375 * [\text{gender}] - 0,108 * [\text{household composition}] - 0,038 * [\text{year of graduation}] - 0,642 * [\text{rating working and living environment city region}] + 0,819 * [\text{location during youth}] + 3,227 * [\text{location during graduation}] + 2,586 * [\text{job location}] - 0,054 * [\text{sector work}] + 0,149 * [\text{internship location}]$$

*Profile graduate 1:*

A 32 year old man, without a family and who graduates ten years ago. He gives a high rating to the working and living environment in Arnhem Nijmegen City Region. He grew up in Arnhem Nijmegen City Region and lived there during graduation as well. He works in another region and has a job which is related to the region's top sectors. He did an internship in Arnhem Nijmegen City Region. The chance that he currently lives in Arnhem Nijmegen City Region is 0,305, thus 31 percent.<sup>1</sup>

*Profile graduate 2:*

Graduate 2 has exactly the same profile as graduate 1, except the fact that this graduate did not live in Arnhem Nijmegen City Region during graduation. In this way, the influence of the location of residence during graduation can be calculated. The chance graduate 2 lives in Arnhem Nijmegen City Region is 8 percent<sup>2</sup>. Thus, a person with the same characteristics as graduate 1 - but who did not live in Arnhem Nijmegen City Region during graduation- has a much smaller chance to live in Arnhem Nijmegen City Region than someone who did live in this region during graduation.

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### 5.3 Which facilities and types of housing are missing in Arnhem Nijmegen City Region?

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The respondents is also asked what facilities are missing in Arnhem Nijmegen City Region (figure 5.9). Just 18 percent of the respondents thinks there is actually missing something in the region. Therefore, just 405 respondents named what they miss in the Arnhem Nijmegen City Region. Most of them miss a night train network. In December 2014 the Dutch Railways (NS) will start with a night train connection between Arnhem Nijmegen City Region and the Randstad. There is thus already an answer to the great demand of a night train connection. Many of the other facilities which are named by the respondents also have to do with transport. A better connection with the Randstad region is very important, better public transport, parking facilities and connectivity with Germany. Furthermore, the respondents are not satisfied with the level of cultural facilities, shops and the quality of the catering industry for people between the 30 and 40 years old. However, like said before, the vast majority of the respondents is satisfied with the current facilities Arnhem Nijmegen City Region has to offer.

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<sup>1</sup> Filling in the regression equation gives 0,823. The chance is calculated with the formula:  $1/((e^{0,823})+1)=0,305$ , thus 30,5 percent chance of living in Arnhem Nijmegen City Region.

<sup>2</sup> Filling in the regression equation gives 11,067. The chance is calculated with the formula:  $1/((e^{11,067})+1)=0,08$ , thus 8 percent chance of living in Arnhem Nijmegen City Region.

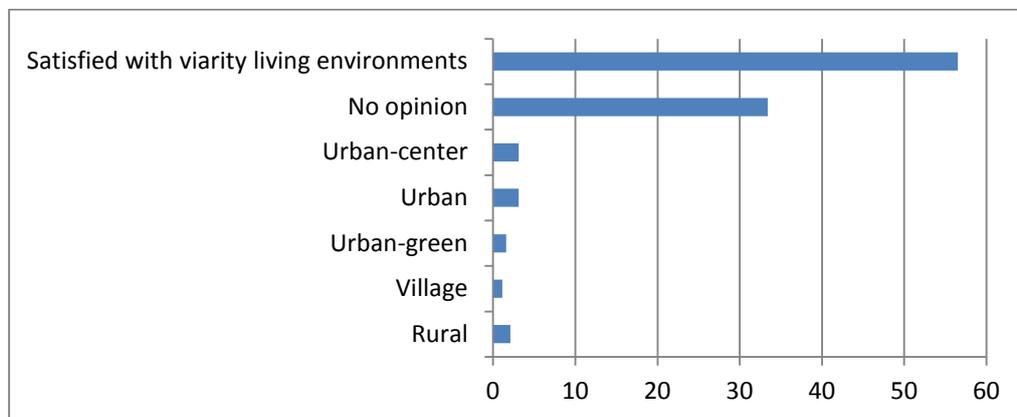
Figure 5.9: Missing facilities in Arnhem Nijmegen City Region



Source: Own creation (Wordle.net)

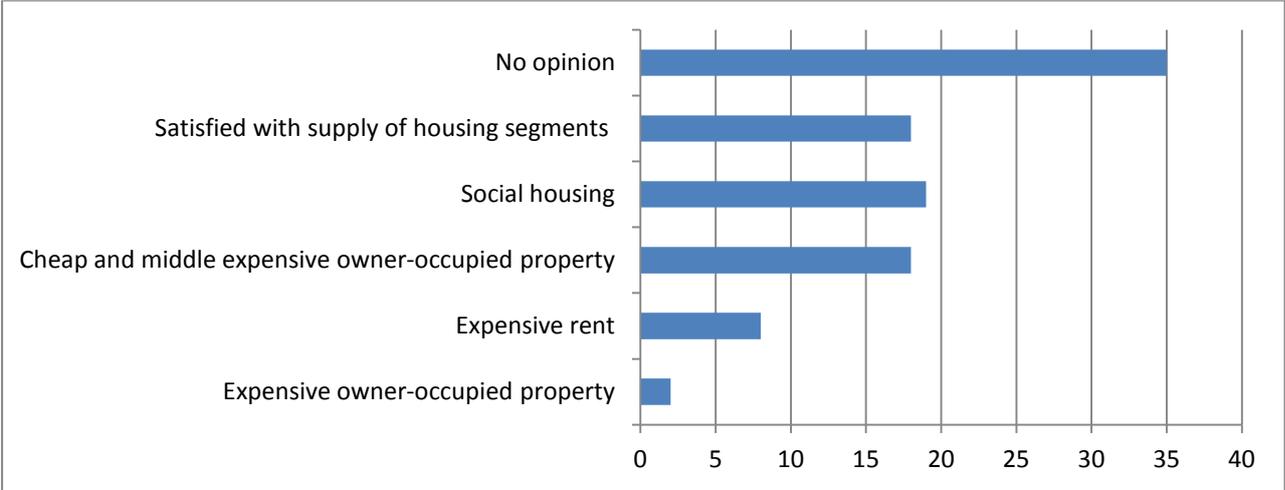
The respondents is also asked in what extend they are satisfied with the variety of housing environments and the supply of the several housing segments in Arnhem Nijmegen City Region (figure 5.10). When it comes to satisfaction of the variety of housing environments in the region, the respondents are mostly very satisfied (57 percent). Another 33 percent does not have an opinion about this topic. Just a few respondents actually miss specific housing environments in Arnhem Nijmegen City Region: 3 percent misses an center-urban environment, another 3 percent misses an urban environment and just 2 percent find that Arnhem Nijmegen City Region does offer too little rural housing environments.

Figure 5.10: Which housing environment do respondents miss in Arnhem Nijmegen City Region?



About the supply of the several housing segments in Arnhem Nijmegen City Region respondents have a more outspoken opinion (figure 5.11). However, also in this case, most respondents (35 percent) do not have an opinion about this topic. Eighteen percent is satisfied with the supply of the different housing segments in the region. However, nineteen percent of the respondents find there is too little social housing available in Arnhem Nijmegen City Region. Another eighteen percent of them find there is too little cheap and middle expensive owner-occupied property available in the region, while eight percent find there is too little expensive rent housing and just two percent find there is too little expensive owner-occupied property in Arnhem Nijmegen City Region.

**Figure 5.11: Are respondents satisfied with the supply of different housing segments?**



**5.4| Educational profile and location of job**

In the framework of regional clusters and top sector policy, it is interesting to find out which graduates find a job within the region and which often have to find jobs elsewhere. These findings could indicate in which sectors there is a mismatch between education and labor market in the region.

First it is interesting to know where graduates found their first job. Is this mainly in the region or are some graduates obliged to move elsewhere to find a fitting job? Table 5.21 shows where graduates found their first job per faculty. It is remarkable that the clear majority finds their first job in Arnhem Nijmegen City Region (40 percent). Twenty six percent of the graduates find their first job in the Randstad region. Graduates in medical sciences and graduates in the faculty of arts do most often find their first job in Arnhem Nijmegen City Region (both 44 percent). The fact that most graduates in medical sciences find their first job in the region, has probably everything to do with the region’s leading position in the health sector, like discussed in chapter 3. Also graduates in the faculty of science most often find their first job in Arnhem Nijmegen City Region, which also fits in the region’s ambition to maintain technical knowledge to strengthen the region’ competitiveness in the field of Energy and Environment Technology and Health technology. Graduates who graduated in the Nijmegen School of Management do most often find their first job in the Randstad (39 percent) and is therefore the only group which does not find a first job in Arnhem Nijmegen City Region the most often. Graduates in the faculty of law do find their first job equally often in Arnhem Nijmegen City Region as in the Randstad (both 32 percent). These findings could indicate that the Arnhem Nijmegen City Region does not offer enough fitting and interesting jobs for graduates in these fields of expertise, which causes these graduates to find a job in –mostly- the Randstad.

**Table 5.21: Location of first job per faculty (%)**

Faculty	Location first job					Total	
	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions		
Faculty of philosophy, theology and religious sciences	39	5	30	9	18	100	(n=57)
Faculty of arts	44	9	22	18	8	100	(n=314)
Nijmegen School of Management	33	5	39	13	9	100	(n=312)
Faculty of medical sciences	44	10	18	18	10	100	(n=317)
Faculty of science	42	8	30	13	7	100	(n=207)
Faculty of law	32	5	32	18	13	100	(n=228)
Faculty of social sciences	43	8	20	18	12	100	(n=502)
<b>Total</b>	40	8	26	16	10	100	(n=1937)
<i><math>\chi^2= 80,750</math> <math>p=0,000</math> Cramer's <math>V= 0,204</math></i>							

During a career people move for jobs which offer better opportunities and therefore are willing to expand their horizon to look for jobs in other regions. Therefore, it is interesting to find out where graduates currently work. Table 5.22 shows where graduates currently work per faculty. It is notable that less people work in Arnhem Nijmegen City Region compared to their first job (37 percent instead of 40 percent). However, this difference is small. The Randstad, North-Brabant and 'other regions' are increasingly popular regions to work (respectively 21, 18 and 13 percent). Graduates in medical sciences work by far the most often in Arnhem Nijmegen City Region (44 percent). Again, it is plausible this has everything to do with the region's leading role in the health sector. Contrary to these graduates, other ones work less in Arnhem Nijmegen City Region compared to the distribution of first jobs. For graduates in the Nijmegen School of Management the Arnhem Nijmegen City Region became even less attractive than during the start of their career. Just 29 percent of them currently works in the region, which is 4 percent less than during their first job. Graduates in the faculty of science currently work in 36 percent of the cases in Arnhem Nijmegen City Region. This is less compared to their first job. For them 'other regions' became more attractive places to work. The Randstad, however, became less popular among these graduates compared to their first job. Thirty percent of them found their first job in the Randstad, but 29 percent of these graduates currently work in the Randstad. Nonetheless do these findings not turn out badly for Arnhem Nijmegen City Region, since the majority of the graduates the region really need for the strengthening of their top sectors works in this region. The Randstad turns out less competitive than initially expected and is therefore less 'threatening' than expected. However, this region is clearly the second most important 'employer' after Arnhem Nijmegen City Region.

**Table 5.22: Current location of job per faculty**

Faculty	Current location of work					Total	
	Arnhem Nijmegen City Region	Other parts of Gelderland	Randstad	North-Brabant	Other regions		
Faculty of philosophy, Theology and Religious sciences	35	3	28	20	15	100	(n=40)
Faculty of Arts	38	6	28	20	8	100	(n=293)
Nijmegen School of Management	29	9	39	16	8	100	(n=291)
Faculty of medical sciences	44	7	19	19	12	100	(n=304)
Faculty of science	36	7	29	14	14	100	(n=192)
Faculty of law	33	5	31	17	14	100	(n=217)
Faculty of social sciences	38	9	21	18	13	100	(n=456)
<b>Total</b>	37	7	27	18	12	100	(n=1793)

$X^2= 59,326$   $p=0,000$  Cramer's  $V= 0,091$

### 5.5] Conclusions: in what extend are graduates rooted in Arnhem Nijmegen City Region?

In what extend do graduates stay in the region of study after graduation and does knowledge stays in the Arnhem Nijmegen City Region? Are graduates rooted in the region and which factors influence this? This paragraph will answer the first three sub questions of this research:

1. *What is the current situation in Arnhem Nijmegen City Region: to what extent do higher educated stay or leave the region after graduation?*
2. *What characteristics do graduates who leave or stay in Arnhem Nijmegen City Region after graduation have?*
3. *What motives do graduates have to leave or to stay in Arnhem Nijmegen City Region after graduation?*

Graduates who lived in Arnhem Nijmegen City Region during their youth live during graduation in this same region more often than graduates who grew up elsewhere. They probably experience an emotional and spatial relationship with the place they grew up (Venhorst et al., 2012b; Jaeger and Kreutzer,2012). This relationship is caused by cumulative inertia: the presence of a network of friends and family which make the graduate stay in the region (Haapanen & Tervo, 2011). Graduates who grew up elsewhere, the region of origin is a popular place to live too. However, they live more often in Arnhem Nijmegen City Region compared to other regions. Arnhem Nijmegen City Region, thus, attracts a lot of students who settle themselves in the Arnhem Nijmegen City Region during their study's. However, do these students stay in the region after graduation?

Arnhem Nijmegen City Region succeeds to keep graduates within the region after graduation. No less than 66 percent of the graduates who lived in the Arnhem Nijmegen City Region during graduation still lives in this region. However, other regions do even a better job in keeping the graduates For example, 85 percent of the graduates who lived in the Randstad region during graduation, still live in this region. The first hypothesis, nevertheless, does not get rejected. After all, only 33 percent of the graduates who lived in Arnhem Nijmegen City Region during graduation moved to other regions. Fielding's concept of the escalator region is therefore not

applicable for Arnhem Nijmegen City Region. Among the leavers, the Randstad region is the most popular destination (34 percent of the leavers choose for this region). There is a significant relationship between the location of residence during graduation and the current location of residence. According to the multivariate analysis the location of residence is by far one of the two most important determinants of the graduates' location choice.

According to the literature cumulative stress dominates the cumulative inertia during graduation (Haapanen & Tervo, 2011). Cumulative stress means that graduates broaden their geographical boundaries to find fitting jobs. However, in Arnhem Nijmegen City Region cumulative inertia seems to dominate cumulative stress. This means that for graduates in this region the accrued social connections play a more important role than the literature suggests. Familiarity with the region and social networks of friends and family binds many of the graduates to the region. Only thirteen percent of the graduates who currently lives in Arnhem Nijmegen City Region wants to leave this region, while 57 percent considers to make this step. The remaining 30 percent want to stay in Arnhem Nijmegen City Region. Despite the fact graduates turn out to be connected with the region of study, they are spatially not strictly connected to the region. After all, 70 percent wants or considers to leave Arnhem Nijmegen City Region. The motives to move are mostly career related. A good perspective on the labor market seems for graduates to be a binding factor, just as Sjaastad (1962) and Venhorst (2012) already diagnosed. Apparently, there is a lack of fitting job opportunities in Arnhem Nijmegen City Region. To make sure that graduates keep staying in Arnhem Nijmegen City Region after graduation in the numbers they currently do, it might be helpful to invest in the creation of jobs which fit with the graduates' educational backgrounds. Motives to stay in Arnhem Nijmegen City Region are mostly related to their bond with the region, their social networks in the region, the green environment and the facilities the region offers.

Another binding factor is doing an internship in the region during studying. Initially, hypothesis 3a gets accepted: graduates who did an internship in Arnhem Nijmegen City Region during their studies currently live more often in this same region than graduates who did an internship elsewhere. Two thirds of the graduates who did an internship in Arnhem Nijmegen City Region still live in this region. In other regions this relationship is way less obvious. Most of them also did an internship in Arnhem Nijmegen City Region. This is understandable, since most of them probably lived in Arnhem Nijmegen City Region as well during their studies. However, according to the multivariate analysis location of internship does not influence the graduate's location choice. A good connection between education and labor market by means of internships, thus, does not have a direct bonding effect on graduates.

The job location turns out to be of major importance in explaining the graduate's location choice. Hypothesis 4a, therefore, gets accepted: graduates who work in Arnhem Nijmegen City Region live more often in this region than graduates who do not work in Arnhem Nijmegen City Region. There is a statistically strong relationship between job location and place of residence. Eighty nine percent of the graduates who work in Arnhem Nijmegen City Region also lives in this region. In the Randstad region this percentage is 73 percent. Graduates who work in other parts of Gelderland outside the Arnhem Nijmegen City Region, however, live in most cases in Arnhem Nijmegen City Region (56 percent). The place graduates work is thus in most cases also the place they live, as already concluded in the literature by Gottlieb & Joseph (2006). This also proves that graduates are spatially very flexible when it comes to job opportunities, which is also already proved by Venhorst et al. (2011b).

The job's sector initially turned out as a very weak determinant of the graduates' spatial behavior. Graduates with a job which is related to one of the region's top sectors live more often in Arnhem Nijmegen City Region than graduates who work in other sectors. However, just like the case of the internships, the job's sector does not turn out a significant determinant in the multivariate analysis.

Also the fifth hypothesis gets rejected: graduates who graduated before 2004 are not more

willing to move to Arnhem Nijmegen City Region than more recently graduated graduates. Graduation year, thus, does not have a statistical relationship with the willingness to move to Arnhem Nijmegen City Region. However, it is very clear that graduates who live outside Arnhem Nijmegen City Region in most cases are not willing to move to this region (40 percent). According to the literature the graduates who graduated longer ago are bonded to the study region (Venhorst et al., 2011a), while the region (merely) functions as an escalator region for more recently graduated graduates (Fielding, 1992). The findings in this research, however, do not confirm these theories, which once again proves Arnhem Nijmegen City Region cannot be labeled as an escalator region.

Just as the previous hypothesis, the sixth hypothesis gets rejected: graduates who found their first job within 3 months after graduation do not live more often in Arnhem Nijmegen City Region than graduates who found their first job after three months after graduation. Graduates who have difficulties finding a job after graduation are not inclined to move elsewhere. These findings are in contradiction with the literature, in which Jaeger and Kreuzer (2012) state that graduates who need more than three months for finding a job tend to expand the geographical boundaries to find a fitting job. It seems therefore unnecessary to give attention to a quick transition between study and labor market in the framework of the aim to keep higher educated in the region.

The seventh hypothesis aimed to test the relationship between the subjective rating of the living and working environment in Arnhem Nijmegen City Region and the willingness to move to this region or the wish to leave this region. Both, hypothesis 8a and 8b are accepted. This means that graduates who give a low ranking are less willing to move to Arnhem Nijmegen City Region than graduates who give a high ranking to the working and living environment in this region. The same goes for the graduates who already live in Arnhem Nijmegen City Region: the ones who give a high ranking do less have the wish to leave the region than the graduates who give a low ranking. Reasons to move to Arnhem Nijmegen City Region mostly have mostly to do with the attractive (green) living environment the region offers and de social networks they have in this region. Glaeser, Kolko and Saiz (2000) already proved that attractive living circumstances is important in the framework of retaining highly educated in the region. The outcomes of this hypothesis confirm this statement. However, there are also motives not to move to Arnhem Nijmegen City Region. These mostly have to do with the bad job opportunities in the region.

The last hypothesis is about the influence of economic en non-economic factors on the graduates' perception of the regional working and living environment in Arnhem Nijmegen City Region. In the literature there is little consensus about which regional factors predominantly determine spatial behavior of highly skilled people. In this research non-economic factors turn out to be more important in explaining the overall perception of Arnhem Nijmegen City Region than economic factors. The valuation of the social atmosphere in the region is the most important determinant. Probably many of the graduates build up a social network during the time they spend in this region and therefore are still socially connected to the region. The fact non-economic mostly determine the perception of Arnhem Nijmegen City Region fits with earlier findings: people value Arnhem Nijmegen City Region because of its attractive (green) living environment.. Even though the region lacks enough fitting jobs, many stay in the region because of this living environment and work elsewhere.

For many differing factors it is tested whether they influence the location choice of graduates. In the multiple regression location of residence during graduation and job location turned out as two factors of major importance when it comes to location choice. Therefore, it is important to create an attractive living environment for students, so they actually move to the region and have the chance to build up a bond with the region. Furthermore, it is recommendable to invest in fitting job opportunities for graduates. A good connection between education and labor

market is therefore of major importance to keep graduates in the region after graduation. Further recommendations will be given in the last chapter.



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## 6| Results qualitative research: key persons in the triple helix speaking

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After the quantitative results, this chapter will discuss the outcomes of the qualitative part of this research. This part aims to provide some insight in what extent local parties as businesses, knowledge institutions and local governments have the ambition to keep local educated knowledge in the region and in what extend these different parties cooperate to improve the connection between education and labor market.

First the regional climate of settlement for businesses will be discussed, since the presence of businesses is crucial within the ambition to keep knowledge in the Arnhem Nijmegen City Region. The paragraphs thereafter will discuss in what extend regional educated knowledge ends up at the regional labor market and which regional partnerships exist between the different parties within the triple helix. The description of the results are based on and related with the statements which are made by one or more of the respondents.

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### 6.1| Regional climate of settlement for businesses and highly skilled people

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The researcher asked the respondents what in their opinion strengths and weaknesses are of Arnhem Nijmegen City Region as a place of settlement for businesses. After all, businesses are crucial for a healthy labor market and thus for the ambition to keep highly graduated alumni in the region. According to some of the respondents the possibility to do business with Germany is one of the most important factors which make Arnhem Nijmegen City Region an attractive region for businesses. The position between the Randstad and the densely populated Ruhr area in Germany is convenient for businesses. However, at the same time respondents find the cross-border cooperation weakly developed. There are many chances to exploit this opportunity much more. The infrastructural connection with Germany is seen as a weakness, since Nijmegen, the biggest city along the Dutch-German border, does not have a direct train connection with Germany:

*'I am convinced that a direct train connection with Duisburg, Düsseldorf, Frankfurt and München will give Nijmegen a huge economic impulse. Connections are essential for the local knowledge economy' (UMC Radboud).*

Other respondents mention that Arnhem Nijmegen City Region lacks international allure, which makes it hard to put the region on the global map as an interesting and innovative region to settle. The organization Health Valley developed an internationalization agenda to develop this weak position. A new initiative is Rockstart. This is a 'bootcamp' idea whereby businesses get intensive support by coaches, resources and housing to help them enter the market as quickly as possible. This initiative aims to attract many businesses and skilled people from all over the world which are related to e-health.

*'It is difficult to put ourselves on the global map as an expertise center. When you are settled in the Randstad you just say 'I have an office in Amsterdam', everybody knows Amsterdam. Nobody knows Nijmegen' (Health Valley).*

Arnhem Nijmegen City Region is also perceived as a moderate dynamic region which is abandoned by many industries:

*'This region is not as dynamic as other regions within the Netherlands. In this respect, this is not a sexy region. We do not offer sparkling job opportunities. Many businesses left the region already' (POA de Liemers).*

Concerning the regional climate for settlement for businesses, Arnhem Nijmegen City Region has steps to make. However, there are several initiatives to put the region on the international map. These projects have only just started, so we have to wait in what extend these initiatives will have any results. However, on the field of regional amenities which are attractive to highly skilled labor people, Arnhem Nijmegen City Region has a lot of strengths, according to the respondents. The region offers an attractive environment to live, with a variety of landscapes, a reasonable cultural program and urban facilities:

*'Nijmegen is situated in an amazing environment in terms of landscape, nature, culture and facilities' (UMC Radboud)*

*'My partner works in Utrecht. We live in this region, but not because of the job opportunities. The quality of living is really good in this region: affordable houses, a beautiful environment and it is relatively close to the Randstad' (Municipality Arnhem)*

*'We have to invest in an attractive climate for settlement, so that people really want to live here. However, it already is a beautiful environment. We have rivers, forests, hills, many attractions and many cultural activities' (kiEMT).*

*'The region offers quality of living, the softer side of climate of settlement' (POA de Liemers).*

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## 6.2| Use of regional knowledge

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An important question in the framework of this research is whether or not companies and institutions recruit their staff on a regional or a broader scale. In the framework of 'retaining local knowledge', the university of applied sciences (Hogeschool van Arnhem en Nijmegen) has a clear regional role:

*'We have a clear regional function and a societal responsibility towards this region. It is important that we deliver labor potential this region needs. Together with the region we monitor what role we can play for them to answer to the labor demand there is in the region' (HAN).*

The research university (Radboud University) initially has a different aim and therefore does feel less responsibility towards the region. For them, it seems more important to compete with other universities to become one of the best universities there are in the field of the university's expertise:

*'It is not our primary aim to fulfill a societal role in 'providing' labor forces and knowledge to the regional labor market. That we provide labor forces to the region is a bonus, but not the main aim. For us it is important to become one of the best universities there is.' (Radboud)*

It is difficult to create an overall conclusion about in what extend local educated knowledge really ends up in the region, since it differs a lot per sector. In the case of technical related labor, which is really important labor in the framework of the regional top sector policy, regional graduates often lack sufficient relevant knowledge. However, respondents mention that even on a national scale it is difficult to find technical staff. Therefore, these businesses even extend their horizon to a global scale when it comes to finding staff with relevant knowledge.

*'Like I said, we need specialist which are often not even available on a national scale. We are forced to recruit our staff on a global scale' (NXP).*

*'The majority of our staff is educated at the Radboud University, undoubtedly. However, we have to recruit toppers from abroad, this is inevitable' (UMC Radboud).*

*'The government finds it very important to keep locally educated people in the region. The province of Gelderland, for example, provides innovation vouchers which can be bought by businesses to import knowledge. In this way, they want businesses to import local knowledge. However, businesses just want the best knowledge which is available' (Health Valley).*

Because of the minimal use of regional educated labor forces within the technical sectors, many respondents draw attention to the (future) shortages on the labor market. According to the respondents, this shortage arises mainly in the technique and the health sector. This shortage on the labor market is, obviously, caused by a shortage of students in technical related studies. Jobs in this sector are decreasingly popular among students. According to the respondents organizations and businesses should take into account these shortages on the labor market and therefore should pay attention to strengthening the connection between education and labor market in the region.

*'There is a clear shortage of technical skilled people in the region, but this is a problem in the whole western world. The Radoud University doesn't offer many technical studies, which is a shame. However, the Radboud University is actively stimulating students to choose beta studies. The beta faculty has grown significantly in recent years. It's a matter of continuously paying attention to stimulate students to do technical studies' (UMC Radboud).*

Often there is the ambition to keep graduates who graduated in the region on the regional labor market as much as possible:

*'We want to keep what we have. However, we also need people from elsewhere to answer to the growing demand of staff in this sector' (kiEMT)*

Despite the fact high-end companies like NXP are very much globally orientated, these businesses are concerned with the youth's interest in technique in the region:

*'We adopted 13 elementary schools in the region. Our staff is permitted to teach kids technique a couple times a year. We want to evoke interest in technique and show them that technique isn't just difficult and dirty, but mostly fun and interesting. Secondly, we also have these kind of contracts with high schools and universities. In these cases we want to evoke interest in technique by giving guest lectures, internships etcetera. After all, it is about staff we need in the future'. (NXP)*

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### **6.3| Regional cooperation structures between knowledge institutions and businesses**

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As discussed in the theoretical framework of this research, a sufficient cooperation within the 'triple helix' is of major importance when it comes to strengthening the regional knowledge economy. Within a triple helix model local governments, entrepreneurs and knowledge institutions closely cooperate. This paragraph will discuss the way in which the different parties within the triple helix in Arnhem Nijmegen City Region cooperate to stimulate knowledge circulation and a sufficient connection between education and labor market.

Organizations and businesses which do utilize regional labor potential and knowledge, maintain structural partnerships with the regional knowledge institutions. Knowledge exchange happens mainly via internships, dual studies and projects of businesses which are done by students. The businesses profit of high skilled labor, cheap labor force and new and innovative ideas.

Especially the bigger employers maintain a structural relationship with the knowledge institutions, like the municipalities and NXP, in providing a structural amount of internships and dual jobs. Smaller businesses often do not have their own Research and Development department, in contrast to the bigger organizations and companies. These businesses often use the research skills from knowledge institutions to answer their practical questions. All companies and organizations do also maintain partnerships with knowledge institutions outside Arnhem Nijmegen City Region. Especially companies in the technique sector are obliged to cooperate with the technical universities which are situated elsewhere in the Netherlands: Twente, Delft and Eindhoven. Partnerships and knowledge-sharing, thus, are not limited to Arnhem Nijmegen City Region.

The regional university of applied sciences, de Hogeschool van Arnhem en Nijmegen (HAN), has a clear ambition to 'deliver' knowledge to the local and regional labor market. The HAN is therefore very much concerned about the link between education and labor market:

*'The regional labor market is our most important market. We are continuously observing how the region develops and which are the most important themes in the region. We created some spearheads in our policy to meet with the demand for higher educated in this region. The majority of our students finds a job in the region' (HAN).*

It is difficult to form an unambiguously conclusion about the relationship between knowledge institutions and the regional economy. However, most of the respondents mention that both the knowledge institutions and the regional businesses are receptive for cooperation. However, in a couple of interviews it comes forward that knowledge institutions have many difficulties to keep up with businesses and therefore, with the labor market. Businesses experience many transitions, innovations etcetera in a vast tempo, while knowledge institutions function in a more slow way. This, among other bottlenecks in the cooperation between the different parties in the triple helix, will be discussed in the next paragraph.

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### 6.3.1| Bottlenecks in cooperation structures

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Obviously there are certain bottlenecks which oppose a flexible connection between education and labor market which need extra attention. This paragraph will discuss the bottlenecks which are mentioned by the respondents. It is notable that most respondents name the same bottlenecks in the cooperation between education and businesses:

- Different agenda's and interests
- Compartmentalization of knowledge institutions (relation management)
- Unfamiliarity with tasks of various parties
- Too little demand-oriented attitude of knowledge institutions
- Too little cooperation among knowledge institutions, Radboud and HAN
- Unsufficient connection between education of Radboud University and demand on labor market

Many of these bottlenecks are caused by internal characteristics of businesses and organizations. These bottlenecks can be improved when the different parties anticipate on them. For example, the nature and interests of knowledge institutions are experienced as problematic for businesses, which causes troubles in the cooperation between the two parties. Despite the fact knowledge institutions are willing to closely cooperate with businesses, they are not always able to do so:

*'There is a clear tempo-difference and a difference in flexibility. When businesses have a question, they want to get served immediately. We are not able to do so, which causes*

*frustrations in businesses. However, we are not always able to 'deliver' when there is demand for something, despite we are really willing to' (HAN).*

However, it is difficult to solve this problem, since knowledge institutions are enormous institutions in which flexibility is hard to realize:

*'Knowledge institutions are massive containers which are difficult to redirect. On the other hand, small businesses easily adapt to new changes in society and the market.. Knowledge institutions and labor market are two different worlds which have different speeds' (POA Liemers).*

Also local governments realize that different agenda's in the region oppose sufficient cooperation between parties:

*'Businesses mostly have a short term agenda. Knowledge institutions, on the other hand, have a long-term agenda and are way less flexible then businesses. We have to deal with two different agenda's with two different aims, which makes cooperation extremely difficult' (Municipality Nijmegen)*

To deal with these two different agenda's and to make these two connect in a more sufficient way, it is necessary for the knowledge institution to make their organization more flexible and to create regional scale cooperation:

*'Knowledge institutions are way more ponderous and need a long term vision. It would be very convenient if these knowledge institutions have a more flexible organization' (Municipality Arnhem).*

*'Because education and labor market are two different worlds with two different speeds, it is necessary to create a closer cooperation on a regional scale between these two worlds'(POA Liemers).*

It is clear there is a need to make the organization of knowledge institutions more flexible, which will favor a closer connection between education and labor market. However, according to the respondents the first steps to accomplish this are already made. For example, it seems that businesses are increasingly involved in the creation of education programs, which promotes a better connection between education and labor market.

*'There is an advise commission which helps think about improving the education curriculum. Secondly, business increasingly are involved in the creation of studies. Dual trajectories for example, make businesses co-creator of the education curriculum'(HAN).*

*'We are very much concerned with the economic development of this region. De HAN provides, for example, on a yearly basis 10.000 interns to the local businesses and institutions. Every intern brings a piece of knowledge in practice, they have new ideas. Thereby, de HAN cooperates a lot with businesses by co-creating projects' (HAN).*

Another bottleneck is that businesses and organizations have difficulties to find the right contact within a knowledge institution. Even within these institutions it is unclear who has contacts with who. These barriers make it difficult to cooperate, which subsequently can cause businesses to give up. There is a need for a central contact person which is responsible for extern relationships.

*'The HAN is extremely separated into different compartments which do not cooperate with each other. Everyone has his own 'shop', which makes it for entrepreneurs difficult to get in contact with the right person' (Health Valley).*

*'The knowledge institutions are compartmentalized which makes it very hard to make agreements with the HAN or the Radboud. They really do their best, but knowledge institutions are enormous institutions which are hard to redirect. On a certain moment entrepreneurs give up trying' (Municipality Arnhem).*

Thereby, it is very important to know what the other party can do for you and vice versa. In many cases this is unclear, which interferes cooperation between parties. Uncertainty is therefore another bottleneck which is put forward by the respondents:

*'Often it is a matter of making clear to each other what you can mean for the other. I notice that it isn't always clear what knowledge institutions have to offer. The attractive thing is that they have knowledge and students who can do research' (Health Valley).*

*'What I see is 'unknown, unloved'. Parties do not know of each other what they have to offer. In this respect, there is a major role for us to make clear what we have to offer. On the other hand it would be convenient if businesses are open about their questions too' (Radboud)*

It is important to maintain contacts. However, sometimes it tends to be difficult to arouse the correct expectations towards other parties. What can someone expect of an intern and what cannot be expected of an intern?

*'Make sure that you keep communicating with each other, so nobody gets disappointed' (POA de Liemers).*

A bottleneck which is in many ways related to the previous ones is that knowledge institutions should work in a more demand-oriented way. At the other hand should businesses operate within a more long-term perspective:

*'We should work in a more demand-oriented way. We should watch out that we do not say 'we know how the world works, so this is the way we educate', while this doesn't answer to the actual demand there is in practice. Conversely should businesses take the longer term more into account. Currently, it costs too much effort to find out what the questions are in practice. We want businesses to know what they need in the long term, because we need time to educate' (HAN).*

*'I heard many times that businesses find that graduates do not have the relevant knowledge businesses actually need. At the other hand do knowledge institutions want businesses to be clearer in what they need. This is an endless discussion' (Health Valley).*

It is clear there are many bottlenecks which make cooperation between knowledge institutions and businesses a difficult task. Most of these bottlenecks are consequences of the major differences that exist between the two groups. Both knowledge institutions and businesses clearly have different interests and aims. The same counts for the third party within the triple helix: the government. A spokesman of the Radboud University clearly explains the differences between the three parties within the triple helix:

*'The government thinks we should valorize so that many new companies will be established, we bring new knowledge on the market and deliver well educated labor forces. Knowledge institutions want to do fundamental research, without anyone else interrupting. Businesses*

*mostly want everything to happen as quickly and as cheap as possible. Within this field valorization has to take place. As you can imagine, this isn't the easiest thing to do' (Radboud)*

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#### 6.4| The role of local and regional governments

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The government plays a minor role in the cooperation structures which are discussed in the previous paragraphs. The respondents point at the government's facilitating role. Governments provide subsidies and can remove certain restrictions. Therefore, they are an important party in several cooperation structures as the Economic Platforms in the region. However, businesses and knowledge institutions are not very sure what role the government can play regarding knowledge circulation and the attraction and retaining knowledge in the region. Municipalities too, seem to be searching for their role regarding these issues. Respondents agree that the connection between education and labor market is an issue which deserves regional attention. However, they do not know which organizational structure should organize this. Some even doubt if it should be regulated by a regional governmental organ and claim the parties in question should organize cooperation themselves.

Just like there are differences in interests and agenda's between businesses and knowledge institutions, governments also have other agenda's and interest compared to businesses and knowledge institutions. For governments it is important that the region they are responsible for is economic healthy and attractive for businesses and highly skilled people. Therefore, it is important for them that locally educated people end up on the local labor market after graduation. However, businesses often have other interests:

*'The government finds it very important that business search for knowledge which is locally of regionally available. Entrepreneurs, on the other hand, are looking for the best knowledge. For them it is not relevant where this knowledge is educated' (Health Valley).*

The respondents mainly assign the government a facilitating role:

*'I think that the government has interests in facilitating employment and economic welfare in the region. I don't have a clear solution for the problems which exist about the connection between education and labor market, but I think that the government, in this respect, can stimulate and facilitate' (Health Valley).*

*'Governments facilitate. In a financial way, but also when it comes to licensing policy. Sometimes you need a license-free zone for innovation to happen. You often see innovations stagnate, because people don't know how to deal with licenses. It's a long way, but the government is increasingly willing to help' (kiEMT).*

*'As a government, we are able to look if we can change something in the regulations or to reduce the amount of rules' (Municipality Nijmegen).*

However, besides facilitating, the government also help think about plans for area development, in cooperation with businesses and knowledge institutions. A clear example is the Novio Tech Campus in Nijmegen:

*'We also closely cooperate with the municipality in the field of area development, in this case the Novio Tech Campus. The Arnhem Nijmegen City Region, for example, helped realizing a new train station: Nijmegen Goffert. Together with local and regional governments we think about how local initiatives can contribute to stimulate the local and region economy' (NXP).*

It is remarkable that respondents of local governments are also searching for their role regarding the connection between education and labor market and the issue of retaining and attracting knowledge workers. One of the respondents even thinks that the responsibility lies with the businesses and knowledge institutions themselves. However, this respondents also mentions that the government has the task to facilitate and to connect people. It is the question in what manner this should take place:

*'It is also for me a puzzle to consider whether there should be a top-down or a bottom-up policy. However, I think the connection of education and labor market is not moldable' (Municipality Arnhem).*

A spokesperson of another municipality in Arnhem Nijmegen City Region says:

*'We can play a facilitating role. Sometimes it is already enough to note certain issues, for example that there is demand in businesses, but insufficient supply in education. In those cases there is a role for us to bring those parties together. We can ask them how we can help, but they have to do the rest' (Municipality Nijmegen).*

The local municipalities see that the connection between education and labor market is a regional or even a national or international issue. However, they doubt if is necessary that a regional governmental organ should organize and facilitate the different parties in the region. A spokesman of the Radboud university too, thinks that cooperation between parties should happen out of own initiative without any party which mediates between groups on a regional scale.

*'I think the connection between education and labor market is eminently an issue which you cannot observe within certain borders. However, I wouldn't link a certain governmental organ to this issue' (Municipality Nijmegen).*

*'I do not believe in regulating everything. I don't think you should designate a certain organization to regulate the connection between education and labor market. The labor market is not moldable. I can imagine someone can play a connecting role, but I think you should watch out for creating too many organizations which will cause the issue to move further away from the primary parties: the knowledge institutions and businesses themselves' (Municipality Arnhem).*

Other parties need local and regional governments to act as marketeers and do not see a role regarding regional knowledge exchange. They indicate the region needs to be put on the map, national and international:

*The government is not a marketeer, they don't have this in their veins. However, they are way too modest in this region. We are allowed to show the jewels we have in this region. I think this aspect needs way more attention at Arnhem Nijmegen City Region, but also at the province and the municipalities. In the field of regional knowledge exchange and cooperation I do not see a role for the regional government (UMC Radboud).*

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## 6.5| Conclusions

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It may be clear that cooperation between the three parties within the triple helix is a major challenge. However, from the perspective of the region it is very important that cooperation between businesses in the region, knowledge institution and government takes place. As discussed in the theoretical framework, it is of major importance to put effort in making a match between education and labor market, since graduates who are spatially more mobile obtain better job-matches than those who stay in the region of study (Hensen et al., 2009; Büchel and

Van Ham, 2003). This chapter discussed several themes which had to do with the cooperation between these different parties in Arnhem Nijmegen City Region and the ways in which knowledge is shared an education and labor market are connected in the region. The sub question which will be answered in this paragraph is:

*'In what way are education and labor market in Arnhem Nijmegen City Region connected with each other and in what extend do different parties within the triple helix cooperate with each other within the field of knowledge sharing?'*

It seems that businesses and knowledge institutions in Arnhem Nijmegen City Region increasingly know to find each other. The Radboud University has relatively strong connections with their own spin-off companies and the bigger organizations in the region. Currently, they still have difficulties in finding their way to the small and medium businesses. The university of applied sciences (HAN), on the other hand, has stronger roots in the region and is mainly connected to the small and medium businesses.

Several times the gap in the labor market regarding technical skilled labor came forward in the interviews with the respondents. Companies and organizations are worried about this and are looking for solutions to 'fill' this gap. Bigger technical oriented companies as NXP are very much forced to cooperate with universities outside Arnhem Nijmegen City Region, since graduates from this region often lack relevant technical knowledge. However, even on a national scale there is a major lack of technical skilled labor, which causes businesses to expand their horizon to a global scale to recruit adequate staff. The impending shortage on the labor market in the field of technique and health can be of the region's interest, since the region wants to present itself as leader in Health and Energy and Environmental Technologies. In the framework of this profile it is very important that businesses and knowledge institutions cooperate to strengthen the region's top sectors and, therewith, the regional competitive advantages. The impending shortages on the labor market, therefore, could be seen as an opportunity for this region.

Companies are often attracted to economic clusters in which companies are technologically related to each other (Porter, 1990). Many businesses are located on a specific spot, because those places have historically been their place of origin. Businesses are path-dependent. Incubator places, as the Novio Tech Campus in Nijmegen, are mainly attractive for the university's spin-off companies. They can benefit from the proximity of the university and related companies. For peripheral and intermediary regions, which have difficulties with maintaining the young professionals, a regional specialization can be of interest (Rosenfeld, 2002). The development of campuses as the Novio Tech Campus can contribute to this and carry out the region's distinctive characteristics. However, also outside these campuses specialization and cooperation is of major importance. Like mentioned by several respondents, different parties are not aware of the role they can play for each other. Subsequently, this causes that there is 'unused labor' in the region, which easily flows towards other regions. The development of the organizations as 'Health Valley' and 'kiEMT' helped in communicating the region's competitive advantages, both towards 'outsiders' and companies which are already in the region.

Initially the different parties in the triple helix had a more 'wait and see' attitude. Initially, it seems that the 'laissez-faire model' as discussed in the theoretical framework is the most applicable on this case. In this model the three organizations mainly operate and function independent. The contact among the three organizations is in this model very limited. (Etzokowitz and Leydesdorff, 2000). According to Delfmann et al. (2009) every organization knows its own traditional role, but at the same time these organizations are able to play the role of another party within a triple helix model. Knowledge institutions, for example, can play the role of an entrepreneur to act in a more commercial way and vice versa. In Arnhem Nijmegen City Region it seems that the different parties still have many difficulties with understanding

each other. However, the different parties are increasingly willing to cooperate with each other, despite their different interests. It seems that they all recognize that cooperation is necessary if the region wants to compete and develop. However, it also seems there is no overall support to increase the use of regional educated knowledge. In most cases the participants bring forward that they do not particularly see the added value of regional educated labor forces compared to other ones. Apparently, the governments relatively stand alone in pursuing this ambition. Spokesmen in businesses and knowledge institutions bring forward that regarding innovation and economic development one cannot allow to think in borders too much. However, politicians are obviously in many cases mostly concerned about the development of their own specific region.

It is striking that every respondent indicates that there are several bottlenecks regarding the cooperation between parties within the triple helix. Respondents advert to the compartmentalization of the knowledge institutions, the different agenda's and aims, unfamiliarity among the different parties and a lack of long-term vision in businesses. Regarding the compartmentalization, in many cases it is too difficult to find the right person to talk about cooperation. Businesses find it valuable as knowledge institutions operate in the 'extern world' by demand-based reasoning. This happens increasingly, but companies suggest this could happen more often. On the other hand do knowledge institutions desire a more open attitude from businesses by clearly indicate what their (long-term) questions are. In this way knowledge institutions know better how to anticipate on these questions which will create a closer connection between education and labor market.

A central 'counter' which functions as a mediator between different parties could initially be seen as an option to bridge the gaps which exist between the triple helix parties. However, most respondents think this would make things even more bureaucratic than they already are. A regional mediator, a role which could be fulfilled by the government, is not desirable either. Most parties bring forward that the initiative to cooperate should come from the knowledge institutions and businesses themselves. Facilitate is the role which is assigned to the government.



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## 7| Conclusions and recommendations

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### 7.1| Introduction

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In what extend does Arnhem Nijmegen City Region functions as a region in which the participating parties within the triple helix cooperate? And in which extend does this influence the way high educated labor forces are rooted in the region? This final chapter will answer the main question of this research:

**Which factors determined the graduates' choice to stay or to leave Arnhem Nijmegen City Region after graduation and in which extend do knowledge institutions, businesses and government cooperate in the region to keep knowledge in the region?**

Paragraph 7.2 will discuss the outcomes of this research. Which motives do graduates have to stay in or to leave the Arnhem Nijmegen City Region after graduation? Which profile do stayers and leavers have? Thereby, it will discuss the outcomes of the qualitative part of this research. This part will give some insights in which ways parties cooperate in the framework of Arnhem Nijmegen City Region as a learning region. Are there any clues of bottlenecks which cause skilled people to leave the region? Paragraph 7.3 will discuss which policy recommendations can be filtered out of the outcomes discussed in the previous paragraphs. Finally, research recommendations will be discussed in paragraph 7.4. This paragraph will reflect on the content, the research process and will give recommendations for further research.

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### 7.2| Is Arnhem Nijmegen City Region an escalator region?

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The main question of this research has two parts. The first part of this question focuses on which motives the individual graduates have whether or not to stay in Arnhem Nijmegen City Region after graduation. This question is answered on the basis of quantitative research. Qualitative research is done to find out in which ways the different parties within the triple helix cooperate to maintain knowledge within the region.

#### *Grow up, study and live in Arnhem Nijmegen City Region*

The majority of the graduates who studies in Arnhem Nijmegen City Region grew up outside this region (74 percent). However, many of these students grew up in neighboring regions as North-East-North-Brabant, North-Limburg and other regions within the province of Gelderland. Just 10 percent grew up in the Randstad region. There is a clear relationship between the place someone grew up and the place of living during graduation and the current location of living. Graduates who grew up in Arnhem Nijmegen City Region relatively live more often in this same region than graduates who grew up elsewhere (73 percent). The bond with the place someone grew up is an example of 'cumulative inertia', which is caused by the presence of a social network of friends and family (Haapanen & Tervo, 2011). Also students who grew up outside Arnhem Nijmegen City Region mostly live in Arnhem Nijmegen City Region during graduation. The region –thus- attracts many students who settle in the region because of their studies in this region. This is an important phase in binding people to a place. For cities and regions which attract many students from elsewhere and which want to bind these people to their region, like Arnhem Nijmegen City Region, the connection between the regional educational programs and the regional labor market is of major importance (Venhorst et al., 2010).

#### *Arnhem Nijmegen City Region is capable in keeping graduates within the region*

Contrary to the expectation and fear that the majority of graduates leaves the region after graduation, it turns out that two third of the graduates who lived in Arnhem Nijmegen City Region during graduation still lives in the region. It seems –thus- that people who get to know

Arnhem Nijmegen City Region as a place to live, often get attached to the region which makes them stay. Graduates often mention the pleasant combination between urban and green facilities in the region and the quality of living the region offers as reasons why they live in Arnhem Nijmegen City Region. It turns out that cumulative stress does not overshadow cumulative inertia in this region. This means that the pressure to find a fitting job does not necessarily mean that people really leave the region they built up a connection with (Haapanen & Tervo, 2011). However, this does not mean that graduates work in the region too.

*The region has difficulties in keeping graduates on the regional labor market*

The region is able to offer an attractive living environment to many of the graduates, but is not capable to offer enough interesting and fitting jobs to them. Most of the respondent who live in Arnhem Nijmegen City Region work in this region too (65 percent). However, they work more often outside their region of living compared to respondents who live elsewhere. This could indicate that graduates in this region are more than average forced to look for jobs elsewhere. It must be noted –however- that Arnhem Nijmegen City Region is by far the smallest region compared to the others. Therefore, the chance to work outside the region of living is bigger for inhabitants of Arnhem Nijmegen City Region than for respondents who live elsewhere.

The most important reasons for people who do leave Arnhem Nijmegen City Region after graduation are clearly career related. Many respondents name that there are no interesting jobs, no jobs for their level and field of education and jobs which offer opportunities in Arnhem Nijmegen City Region. Sjaastad's classic theory in which is stated that career perspective is the main reason to move –thus- still seems applicable (Sjaastad, 1962). Career-wise the Arnhem Nijmegen City Region could be considered as an escalator region, since many graduates find a job outside the region. However, graduates do not necessarily leave the region completely just because other regions offer better job opportunities. Like Gertler (2005) mentioned, not just career related factors are important in binding people to a region. According to him the quality of life is a very important factor too, when it comes to retaining highly skilled graduates. In this respect, Arnhem Nijmegen City Region confirms his findings. The reason why people are able to live in Arnhem Nijmegen City Region and work elsewhere has everything to do with the fact that the region cannot be considered as a peripheral region, but more as an intermediary region. The region's accessibility with the country's economic core region is relatively good, particularly when the region is compared with real peripheral escalator cities as Groningen and Enschede.

*An internship is not a binding factor....*

Graduates who did an internship in Arnhem Nijmegen City Region during their study turn out to live in this same region more often than graduates who did not do an internship in the region. However, in the end an internship does not turn out to be a determinant of location choice. Therefore internships cannot be considered as a factor which binds them to the region. Probably they often do not get a job at their internship organization or do not build up a professional network during their internship which results in a job, like initially expected (Venhorst, 2011b). In the framework of retaining knowledge, it is therefore not necessarily needed to put extra effort in creating extra or better internship places.

*...nor is a job in one of the region's top sectors.*

Initially a job in one of the region's top sectors turned out as a very weak determinant of the graduates' spatial behavior. However, in the logistic regression analysis this variable turned out not to be of appreciable influence on the location choice of graduates. This means that graduates who work in one of the region's top sectors relatively do not live in the region more often than graduates who work in other sectors. However, when the health sector is defined in a broader sense and when public health care is included in this sector, it seems that Arnhem Nijmegen City Region is a very important employer for graduates who are specialized in this sector. Graduates in medical sciences work by far the most often in Arnhem Nijmegen City Region (44 percent). The region's leading role in the health sector has everything to do with this high percentage. Despite the fact the region loses specific kind of graduates, for example the ones who studied in

the Nijmegen School of Management, the region maintains the majority of the graduates who studied in the faculty which are most important to the region's top sectors. The Randstad turns out less competitive than initially expected and is therefore less 'threatening' than expected. However, this region is clearly the second most important 'employer' after Arnhem Nijmegen City Region.

Regional specialization is of major importance when it comes to retaining young and talented people (Rosenfeld, 2002). Arnhem Nijmegen City Region specializes in specific sectors which makes it increasingly interesting for high educated graduates to stay in the region, at least, the ones who did fitting education. In the interviews it comes forward that knowledge institutions and businesses increasingly cooperate with each other. Despite the differences between the different parties in the region's triple helix, most of them bring forward that valorization is of major importance. However, there are several bottlenecks which need to be overcome. The different parties understand it is necessary to cooperate to secure and strengthen the region's competitive economic position. Therefore, they are increasingly willing to 'open up' to each other. It seems that businesses and knowledge institutions in Arnhem Nijmegen City Region increasingly know to find each other. The Radboud University has relatively strong connections with their own spin-off companies and the bigger organizations in the region. The university of applied sciences (HAN), on the other hand, has stronger roots in the region and is mainly connected to the small and medium businesses.

An important bottleneck regarding cooperation is that the different parties are not aware of the role they can play for each other. Subsequently, this causes that there is 'unused labor' in the region, which easily flows towards other regions. The development of the organizations as 'Health Valley' and 'kiEMT' helped in communicating the region's competitive advantages, both towards 'outsiders' and companies which are already settled in the region.

*A positive perception of Arnhem Nijmegen City Region contributes to willingness to move to and stay in the region.*

Graduates who give a low ranking are less willing to move to Arnhem Nijmegen City Region than graduates who give a high ranking to the working and living environment in this region. The same goes for the graduates who already live in Arnhem Nijmegen City Region: the ones who give a high ranking do less have the wish to leave the region than the graduates who give a low ranking. The region scores high regarding its living environment. Arnhem Nijmegen City Region is mostly valued because of the region's attractive combination of green and urban facilities. In addition, social networks graduates built up in this region contributes to the region's attractiveness. Reasons not to stay in the region or not to move to the region mostly have to do with the unfavorable labor market conditions in the region. According to most respondents the region does not offer enough fitting and interesting job opportunities. Moreover, graduates who live in Arnhem Nijmegen City Region are the least positive about the region's labor market. Graduates who live elsewhere have a better image of the labor market in Arnhem Nijmegen City Region. The same counts for the regional housing market: locals are more pessimistic than the outsiders. Locals often indicate there is a shortage of social housing and cheap- and middle expensive owner occupied property in the region. It should be mentioned, however, that the majority of outsiders are not willing to move to Arnhem Nijmegen City Region. Inhabitants of the region, on the other hand, mostly wish to stay in the region.

The graduate's perception of Arnhem Nijmegen City Region is mostly based on the 'soft' non-economic factors. This means they link the region more often to the idea of a pleasant living environment than to the idea of a place in which it is hard to find fitting jobs. The valuation of the social atmosphere in the region is the most important determinant. Probably many of the graduates built up a social network during the time they spend in this region and therefore are still socially connected to the region.

### *Arnhem Nijmegen City Region is not an escalator region*

It can be concluded that Arnhem Nijmegen City Region cannot be characterized as an escalator region. The region does attract students which originally are from regions which border with Arnhem Nijmegen City Region. They often come to live in the region during studying. After graduation, however, they often do not leave the region as in one of Fielding's (1992) escalator regions. A possible explanation for the fact Fielding's theory is not applicable on Arnhem Nijmegen City Region has to do with the region's location within the Netherlands. Although the region lacks enough opportunities on the labor market, the region is close enough to regions which do offer jobs. This makes it possible for graduates to live in Arnhem Nijmegen City Region and enjoy the attractive living environment the region offers. However, the region could benefit more if it could offer better job opportunities for the graduates. Namely, many respondents indicate they are willing to leave Arnhem Nijmegen City Region if there are interesting job opportunities elsewhere. Graduates are, therefore, not necessarily strictly bonded to the region which can be seen as a threat.

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### 7.3| Policy recommendations

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Arnhem Nijmegen City Region is the third economic center of the Netherlands, after the Randstad and the Eindhoven region. The region has the ambition to strengthen their economic position. In a knowledge-based economy it is important to maintain knowledge within the region. This is, therefore, an important ambition the region has. However, businesses and knowledge institutions are yet weakly connected with each other. The same counts for the connection between the graduates and the regional labor market. On the basis of the outcomes presented in the previous paragraph, this paragraph will draw some policy recommendations which can be used in future regional policy.

#### *Improve the connection between education and labor market*

The first recommendation is maybe already the most complex one. Because of the limited use of regional educated labor force and the mutual unfamiliarity between knowledge institutions and businesses there is a certain friction between education and labor market. The 'supply' of knowledge does often not fit sufficiently with the regional demand for labor. The future shortages of technical skilled labor which is needed for the strengthening of the top sectors in Arnhem Nijmegen City Region cannot be filled with 'regional knowledge'. Currently, education in Arnhem Nijmegen City Region is too less focused on technical studies. A proper connection between education and labor market can be achieved by having more intensive contact and more information exchange between knowledge institutions and the regional businesses. Both parties should have a pro-active attitude.

#### *Prevent bureaucratic complexity*

The qualitative research made clear there is no demand for extra consultation structures in which the connection between education and labor market is mediated. Respondents name there are already too many complex cooperation structures which counterwork real cooperation. There is- thus- no role for the regional government to bring different parties within the triple helix in contact with each other. According to most respondents the government should continue with its current facilitating role.

#### *Give attention to the climate of settlement for students*

It is of major importance to give attention to the region's climate of settlement for students first. The region should be aware of 'skipping' this step and immediately continue to the improvement of the region's climate of settlement for graduated highly skilled people. The outcomes of the quantitative research have shown that graduates who actually lived in Arnhem Nijmegen City Region during graduation end up in this same region more often than the ones who lived elsewhere during graduation. During their time of study, students built up a social network in the region which makes them attached to the region. This causes 'cumulative inertia', which

means they are spatially attached to the region and therefore less inclined to leave the region after graduation. Therefore, it is of major importance to offer enough and attractive housing opportunities and facilities for students. Probably, there will be differences within this region as well, since Nijmegen is often perceived as a more attractive place for students than Arnhem. However, other research should tell which factors make students come to Arnhem Nijmegen City Region and which factors keep them away.

#### *Keep investing in the living environment*

Arnhem Nijmegen City Region has to offer a qualitative and attractive living environment. The unique combination between green and urban facilities make the region strong and distinctive, compared to, for example, the Randstad. Therefore it is necessary to keep investing in the living environment. After all, this is for many of the respondents who participated in this research the reason they still live in this region. Inhabitants turn out to be not completely satisfied with the housing market in the region. Particularly they miss social housing and cheap- and middle expensive owner occupied properties in Arnhem Nijmegen City Region. In the framework of retaining knowledge in the region, it is recommendable to answer to this question by realizing more housing opportunities within these segments.

#### *Consolidate the region's leading position in its top sectors*

It may be clear that most graduates are unsatisfied with the job opportunities in Arnhem Nijmegen City Region. Therefore, it is necessary to attract businesses which offer these job opportunities. Of course, achieving this is easier said than done. But at the same time this is the only opportunity to strengthen the region's labor market and therefore an important step in realizing the ambition to maintain knowledge in the region. For peripheral and intermediary regions, which have difficulties with maintaining the young professionals, a regional specialization can be of interest (Rosenfeld, 2002). Therefore, it is recommendable to strengthen the sectors which make the region compatible and distinctive. Arnhem Nijmegen City Region defined five top sectors. To strengthen the region distinctiveness and to give the region a clear profile which is appealing to businesses and highly skilled people, it may be necessary to reduce this amount of sectors to one or two. Of course other sectors should not be forgotten, but it is not possible to put a region on the map on the basis of five different sectors. Health is for sure one of those two, since the region has a lot to offer in this field of expertise. The UMC Radboud is one of the country's leading research hospitals and the region offers approximately 50.000 jobs in this sector within 2.000 businesses. It is recommendable to lie a stronger connection with Health Valley – an organization which becomes increasingly well known.

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## 7.4| Research recommendations

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This paragraph will by means of research recommendations reflect on this research. Therefore, this paragraph will discuss the shortcomings of this research as regards the content of this research as the methodology to gather the data. These research recommendations intend to give advices for future, similar researches.

#### *Interview small and middle size businesses*

To give a proper overview of the way in which the different parties within the region's triple helix cooperate, it is necessary to also take small and middle size businesses into account. There is a chance these kind of businesses are way more regionally rooted compared to bigger businesses and organizations as NXP and UMC Radboud. Therefore, the picture which is drawn in this research may be incomplete. For further research it is recommendable to take all sizes businesses into account.

#### *Involve all high educated graduates in the research to give a complete picture*

Because of privacy reasons it was not possible to involve graduates of the university of applied sciences (De Hogeschool van Arnhem en Nijmegen) and because of a lacking contact data list it

was not possible to involve graduates of the ArtEZ Art academy. Since the spokesman of the HAN indicated that his institution is way more regionally rooted than the Radboud University, it is to be expected that the spatial behavior of HAN graduates clearly differ from Radboud graduates. Therefore, it would be interesting for future research to make it possible to involve all highly skilled graduates in the research.

*Specify data per municipality*

Arnhem Nijmegen City Region is a very varied region. There is a typical university city in the region: Nijmegen. Arnhem does not have a university, which makes the city very different from Nijmegen. Surrounding municipalities, again, differ a lot. Some could be characterized as very rural, others as suburban. This diversity has its effects on the outcomes of this research. Therefore, it could be interesting to specify the data per municipality. Probably, this will uncover a lot of new, unknown patterns. Is it, for example, mainly Nijmegen which is responsible for the high percentage of graduates which sticks in the region after graduation? Or do the graduates move to more rural municipalities after graduation? The data set of this research is constructed in such a way further analysis is possible.

*Do research on the region's attractiveness among future students*

As discussed before, the outcomes of the quantitative research have shown that graduates who actually lived in Arnhem Nijmegen City Region during graduation end up in this same region more often than the ones who lived elsewhere during graduation. This has to do with cumulative inertia, which means they are spatially attached to the region and therefore less inclined to leave the region after graduation. It could therefore be interesting to find out which image Arnhem Nijmegen City Region has among future students. Does the region offer what students need? After all, these students form the future high educated labor force.

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Stadsregio Arnhem Nijmegen

Radboud Universiteit



# Onderzoek onder alumni

Geachte alumnus,

U heeft een opleiding gevolgd aan één van de kennisinstellingen in de Stadsregio Arnhem Nijmegen nl. de Radboud Universiteit Nijmegen. Daarom heeft u ervaren hoe het was om in deze regio te studeren. Een masterstudent van de Radboud Universiteit doet in opdracht van de Stadsregio Arnhem Nijmegen onderzoek naar de binding van hoogopgeleiden met de Stadsregio. De universiteit verstuurt deze mail met inachtneming van de privacy regels. De Stadsregio wil hoogopgeleiden aan zich binden door beter in te spelen op de wensen van afgestudeerden. Hiervoor zijn we erg benieuwd om welke redenen u na afstuderen heeft besloten in de Stadsregio te blijven of de regio verlaten heeft en vragen wij u onderstaande vragenlijst in te vullen.

U kunt **hier** de vragenlijst invullen.

Het invullen van de vragenlijst duurt ongeveer 10 minuten. Wij hopen van harte dat u aan dit onderzoek wilt meedoen! Uiteraard worden de gegevens volstrekt vertrouwelijk behandeld en anoniem verwerkt. Onder de deelnemers verloten we **5 VVV-cadeaubonnen t.w.v. €50,-**. Het onderzoek wordt uitgevoerd door Robin Feijten, masterstudent Urban Geography aan de Radboud Universiteit. Heeft u vragen naar aanleiding van deze mail of over het onderzoek? Neem dan contact op met Robin Feijten:

E-mail: [rfeijten@destadsregio.nl](mailto:rfeijten@destadsregio.nl)

Tel: 06-53782465

Ik dank u alvast hartelijk voor uw medewerking!

Met vriendelijke groet,

Jolanda van Rensch

Sr. Projectleider/adviseur regionale ontwikkeling

Stadsregio Arnhem Nijmegen

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## Appendix 2: Questionnaire graduates

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### Vragenlijst afgestudeerden

De Stadsregio Arnhem Nijmegen is momenteel de vierde economische regio van Nederland en heeft de ambitie dit te blijven. Hoogopgeleiden zoals u, zijn van groot belang voor de economische kracht van de regio. Het is daarom voor ons interessant om te weten wat uw woonplaatskeuzes zijn geweest en welke redenen u heeft gehad om na afstuderen in de regio te blijven of de regio te verlaten.

Onder de deelnemers verloten we 5 VVV-cadeaubonnen t.w.v. €50,-

Voor het invullen van deze vragenlijst is het van belang dat u op de hoogte bent van welke gemeenten deel uitmaken van de Stadsregio Arnhem Nijmegen. De volgende gemeenten maken deel uit van deze Stadsregio:

Arnhem, Beuningen, Duiven, Doesburg, Groesbeek, Heumen, Montferland, Mook en Middelaar, Lingewaard, Nijmegen, Overbetuwe, Renkum, Rheden, Rijnwaarden, Rozendaal, Ubbergen, Westervoort, Wijchen en Zevenaar.

In onderstaande kaart staan deze gemeenten ter verduidelijking visueel weergegeven:



Veel succes bij het invullen van deze vragenlijst en bij voorbaat dank!

## OPLEIDING

De volgende vragen gaan over de opleiding die u heeft gevolgd aan één van de onderwijsinstellingen in de Stadsregio Arnhem Nijmegen

### 1. Aan welke onderwijsinstelling heeft u uw opleiding gevolgd?

- De Radboud Universiteit
- De Hogeschool van Arnhem en Nijmegen
- De ArtEZ Hogeschool voor de Kunsten

### 2. Aan welke faculteit op de Radboud Universiteit heeft u uw opleiding gevolgd?

- Faculteit der Filosofie, Theologie en Religiewetenschappen
- Faculteit der Letteren
- Faculteit der Managementwetenschappen
- Faculteit der Medische Wetenschappen
- Faculteit der Natuurwetenschappen, Wiskunde en Informatica
- Faculteit der Rechtsgeleerdheid
- Faculteit der Sociale Wetenschappen

### 3. Waarom heeft u destijds gekozen voor deze onderwijsinstelling?

*Max. 3 antwoorden mogelijk*

- Vanwege de aantrekkelijkheid van Nijmegen als studielocatie
- Ik zie de Radboud Universiteit als een van de betere universiteiten in Nederland
- Omdat de Radboud Universiteit voor mij de dichtstbijzijnde universiteit is met de geschikte opleiding
- Omdat de Radboud Universiteit de enige universiteit is die mijn opleiding aanbood
- Omdat het gevestigd is op een kenniscampus
- Anders, namelijk.....

### 4. Aan welke faculteit of Instituut op de Hogeschool van Arnhem en Nijmegen heeft u uw opleiding gevolgd?

- Economie, Management en Recht
- Techniek en Life Sciences
- Informatica, media en Communicatie
- Onderwijs en Opleiden
- Gedrag en Maatschappij
- Gezondheid
- Sport en Bewegen

### 5. Waarom heeft u destijds gekozen voor deze onderwijsinstelling?

*Max. 3 antwoorden mogelijk*

- Vanwege de aantrekkelijkheid van Arnhem en/of Nijmegen als studielocatie
- Ik zie de Hogeschool van Arnhem en Nijmegen als een van de betere hogescholen in Nederland

- Omdat de Hogeschool van Arnhem en Nijmegen voor mij de dichtstbijzijnde hogeschool is met de geschikte opleiding
- Omdat de Hogeschool van Arnhem en Nijmegen de enige hogeschool is die mijn opleiding aanbood
- Omdat het gevestigd is op een kenniscampus
- Anders, namelijk.....

**6. Aan welke faculteit of Instituut op de ArtEZ Hogeschool voor de Kunsten heeft u uw opleiding gevolgd?**

- ArtEZ Academie voor Art & Design
- ArtEZ Conservatorium
- ArtEZ Academie voor Theater
- ArtEZ Dansacademie
- ArtEZ Academie van Bouwkunst
- ArtEZ Expertisecentrum Kunsteducatie

**7. Waarom heeft u destijds gekozen voor deze onderwijsinstelling?**

*Max. 3 antwoorden mogelijk*

- Vanwege de aantrekkelijkheid van Arnhem en/of Nijmegen als studielocatie
- Ik zie de ArtEZ als een van de betere hogescholen voor de kunsten in Nederland
- Omdat de ArtEZ voor mij de dichtstbijzijnde hogeschool voor de kunsten is met de geschikte opleiding
- Anders, namelijk.....

**8. In welk jaar bent u afgestudeerd aan deze opleiding?**

-----

**STAGE TIJDENS STUDIE**

De volgende vragen gaan over een eventuele stage die u heeft gelopen bij uw opleiding.

**9. Heeft u stage gelopen tijdens uw opleiding?**

- Ja
- Nee

**10. In welke gemeente heeft u uw laatste stage gelopen?**

- \_\_\_\_\_
- Buitenland

**11. Wat is de naam van het bedrijf waar u uw laatste stage heeft gelopen?**

\_\_\_\_\_

**12. De Stadsregio Arnhem Nijmegen heeft vier speerpuntsectoren: Health, Energie en Milieutechnologie, Creatieve Industrie en Logistiek. Heeft u stage gelopen in één van deze sectoren, en zo ja, welke?**

- Ja, ik heb stage gelopen in de Health sector
- Ja, ik heb stage gelopen in de Energie en Milieutechnologie sector
- Ja, ik heb stage gelopen in de Creatieve Industrie sector
- Ja, ik heb stage gelopen in de Logistiek sector
- Nee, ik heb stage gelopen in een andere sector, namelijk \_\_\_\_\_

**13. Wat waren uw belangrijkste werkzaamheden tijdens deze stage?**

---

## WOONSITUATIE

De volgende vragen gaan over uw woonsituatie en (eventuele) verhuizingen.

**14. Wat was uw woongemeente tijdens het grootste deel van uw jeugd?**

- \_\_\_\_\_
- Buitenland

**15. Wat was u woongemeente ten tijde van uw afstuderen?**

- \_\_\_\_\_
- Buitenland

**16. Waarom woonde u ten tijde van uw afstuderen in die gemeente?**

*Max. 3 antwoorden mogelijk (code 1 t/m 3 naar volgorde belang: belangrijkste reden met 1 aangeven, minst belangrijke reden met 3)*

- Dichterbij mijn opleiding / school
- Een betere arbeidsmarkt
- Een baan
- Beter woningaanbod
- Wonen in een (grotere) stad
- Meer voorzieningen
- Ik ben zelfstandig gaan wonen
- Partner woont hier
- Huwelijk of samenwonen
- Gezinsuitbreiding
- Vrienden of familie
- Plaats waar ik ben opgegroeid
- Eigen bedrijf
- Bij mijn ouder(s) / verzorger(s)
- Een groene woonomgeving

- Stage
- Anders, namelijk \_\_\_\_\_

**17. Woont u nog steeds in dezelfde gemeente als tijdens het laatste jaar van uw opleiding?**

- Ja
- Nee

**18. Naar welke gemeente bent u na uw opleiding verhuisd (eerste verhuizing)?**

- \_\_\_\_\_
- Buitenland

**19. Wanneer bent u naar deze gemeente verhuisd (jaar)?**

— — — — —

**20. Waarom bent u naar deze woongemeente verhuisd?**

*Max. 3 antwoorden mogelijk (code 1 t/m 3 naar volgorde belang: belangrijkste reden met 1 aangeven, minst belangrijke reden met 3)*

- Een baan
- Betere arbeidsmarkt
- Beter woningaanbod
- Wonen in een (grotere) stad
- Meer voorzieningen
- Ik ben zelfstandig gaan wonen
- Partner woont hier
- Huwelijk of samenwonen
- Gezinsuitbreiding
- Vrienden of familie
- Terug naar plaats waar ik ben opgegroeid
- Eigen bedrijf
- Ik verhuis mee met mijn ouder(s) / verzorger(s)
- Een groene woonomgeving
- Anders, namelijk

**21. Hoeveel keer bent u, na uw afstuderen, verhuisd?**

\_\_\_keer

**22. Wat is uw huidige woongemeente?**

- \_\_\_\_\_
- Buitenland

**23. Hoe zou u het woonmilieu omschrijven waarin u nu woonachtig bent?**

- Centrum-stedelijk
- Stedelijk vooroorlogse woning
- Stedelijk naoorlogse woning
- Groen stedelijk (buitenwijken en Vinex-wijken)
- Centrum dorps (kernen dorpen en kleine stadjes)
- Dorps (kleinere kernen)
- Landelijk (buitengebied)
- Anders, namelijk\_\_\_\_\_

**24. Naar welk woonmilieu gaat uw voorkeur?**

- Centrum-stedelijk
- Stedelijk vooroorlogse woning
- Stedelijk naoorlogse woning
- Groen stedelijk (buitenwijken en Vinex-wijken)
- Centrum dorps (kernen dorpen en kleine stadjes)
- Dorps (kleinere kernen)
- Landelijk (buitengebied)
- Anders, namelijk\_\_\_\_\_

**25. In welk segment bent u woonachtig?**

- Sociale huur
- Dure huur
- Goedkope koop
- Middel dure koop
- Dure koop

**26. In welk type woning woont u?**

- Eengezinswoning
- Meergezinswoning
- Appartement
- Vrijstaand
- Anders, namelijk\_\_\_\_\_

**27. Wilt, moet of gaat u binnen 5 jaar verhuizen?**

- Beslist niet
- Eventueel wel, misschien
- Beslist wel

**28. Waar naartoe zou u bij voorkeur verhuizen?**

- Zelfde woonplaats als waar ik nu woon
- Weet ik niet
- Gemeente/ regio:\_\_\_\_\_

**29. Waarom zou u daarheen willen verhuizen?**

*Max. 3 antwoorden mogelijk (code 1 t/m 3 naar volgorde belang: belangrijkste reden met 1*

*aangeven, minst belangrijke reden met 3)*

- Een baan
- Betere arbeidsmarkt
- Beter woningaanbod
- Wonen in een (grotere) stad
- Meer voorzieningen
- Ik ben zelfstandig gaan wonen
- Partner woont hier
- Huwelijk of samenwonen
- Gezinsuitbreiding
- Vrienden of familie
- Terug naar plaats waar ik ben opgegroeid
- Dichterbij mijn opleiding / school
- Eigen bedrijf
- Ik verhuis mee met mijn ouder(s) / verzorger(s)
- Een groene woonomgeving
- Anders, namelijk\_\_\_\_\_

**30. Bent u momenteel woonachtig in één van de 20 gemeenten binnen de stadsregio Arnhem Nijmegen?**

- Ja
- Nee

**31. Zou u (eventueel) willen verhuizen naar de Stadsregio Arnhem Nijmegen?**

- Ja
- Nee
- Misschien
- Weet ik niet

**32. Waarom zou u (eventueel) willen verhuizen naar de Stadsregio Arnhem Nijmegen?**

---

**33. Waarom zou u niet (eventueel) willen verhuizen naar de Stadsregio Arnhem Nijmegen?**

---

**34. Zou u de Stadsregio Arnhem Nijmegen willen verlaten en naar elders willen verhuizen?**

- Ja
- Nee
- Misschien

- Weet ik niet

**35. Waarom zou u de Stadsregio Arnhem Nijmegen willen verlaten?**

---

**36. Waarom wilt u de Stadsregio Arnhem Nijmegen niet verlaten?**

---

## HUIDIGE ARBEIDSMARKTSITUATIE

**37. In welke gemeente was uw eerste baan na afstuderen?**

- \_\_\_\_\_
- Buitenland
- Nog geen baan gevonden na afstuderen

**38. Hoelang heeft u gezocht naar uw eerste baan na afstuderen, voordat u deze had?**

- 0-3 maanden
- 4-6 maanden
- 7 maanden of langer

**39. Welke situatie is momenteel het meest op u van toepassing?**

- Ik heb een betaalde baan
- Ik ben arbeidsongeschikt
- Ik ben werkloos / werkzoekend / niet werkzaam
- Ik ben huisvrouw / huisman
- Ik ben scholier / student

**40. In welke gemeente bent u nu werkzaam?**

- \_\_\_\_\_
- Buitenland

**41. De Stadsregio Arnhem Nijmegen heeft vier regionale speerpunten: Health, Energie en Milieutechnologie, Creatieve Industrie en Logistiek. Bent u werkzaam in één van deze sectoren, en zo ja, welke?**

- Ja, ik ben werkzaam in de Health sector
- Ja, ik ben werkzaam in de Energie en Milieutechnologie sector
- Ja, ik ben werkzaam in de Creatieve Industrie sector
- Ja, ik ben werkzaam in de Logistiek sector
- Nee, ik ben werkzaam in een andere sector, namelijk \_\_\_\_\_

**42. Hoe zou u uw functie omschrijven?**

---

**43. Wat voor type aanstelling heeft u momenteel?**

- Een vaste aanstelling (arbeidsovereenkomst van onbepaalde duur)
- Een tijdelijke aanstelling
- Uitzendkracht
- Oproepkracht
- Zelfstandig ondernemer
- Anders, namelijk \_\_\_\_\_

## WAARDERING STADSREGIO ARNHEM NIJMEGEN

De volgende vragen gaan over het werk- en woonklimaat in de Stadsregio Arnhem Nijmegen (ook voor mensen die buiten deze regio wonen)

### 44. Wilt u een rapportcijfer geven voor de volgende aspecten van het werk- en woonklimaat in de Stadsregio Arnhem Nijmegen

(1 = zeer slecht en 10 = zeer goed) {antwoordcategorieën 1 t/m 10, weet niet/geen mening}.

Cijfer
Werkgelegenheid (kans op werk)
Diversiteit aan werkgevers
Aanwezigheid van interessante banen met kans op promotie
Diversiteit aan banen/functies
Sfeer / gezelligheid
Winkelvoorzieningen
Aanwezigheid groen / natuur
Aanbod horeca
Aanbod evenementen
Aanbod passende woonruimte
Podiumkunsten (theater en popmuziek) / musea
Recreatieve voorzieningen
Infrastructuur voor auto
Infrastructuur openbaar vervoer
Infrastructuur voor fiets

### 45. Welk rapportcijfer geeft u aan de Stadsregio Arnhem Nijmegen als woon- en werkregio?

\_\_\_\_\_

### 46. In hoeverre vindt u onderstaande aspecten van belang in uw woonomgeving? (geef per categorie aan hoe belangrijk u deze vindt)

	Ze er on be lang rijk	On be lang rijk	Ne u traal	Be lang rijk	Ze er be lang rijk
Nabijheid treinstation	-2	-1	0	1	2
Verbinding met de Randstad per openbaar vervoer	-2	-1	0	1	2
Bereikbaarheid voorzieningen per openbaar vervoer	-2	-1	0	1	2
Bereikbaarheid	-2	-1	0	1	2

voorzieningen per fiets					
Bereikbaarheid werk per fiets	-2	-1	0	1	2
Fietsparkeermogelijkheden	-2	-1	0	1	2
Afstand tot snelweg	-2	-1	0	1	2
Parkeergelegenheden voor auto	-2	-1	0	1	2
voorzieningen per auto					
Goede doorstroming op autowegen	-2	-1	0	1	2
Bereikbaarheid	-2	-1	0	1	2

**47. Vindt u de aanwezige woonmilieus in de Stadsregio Arnhem Nijmegen voldoende gevarieerd en zo niet, welke woonmilieus mist u? (meerdere antwoorden mogelijk)**

- Ja, ik vind de aanwezige woonmilieus voldoende gevarieerd
- Nee, ik mis het *Centrum-stedelijk* woonmilieu
- Nee, ik mis *Stedelijk vooroorlogs* woonmilieu
- Nee, ik mis *Stedelijk naoorlogs* woonmilieu
- Nee, ik mis *Groen* stedelijk woonmilieu (buitenwijken en Vinex-wijken)
- Nee, ik mis *Centrum* dorps woonmilieu (kernen dorpen en kleine stadjes)
- Nee, ik mis *Dorps* woonmilieu (kleinere kernen)
- Nee, ik mis *Landelijk* woonmilieu (buitengebied)
- Nee, ik mis een *ander* woonmilieu, namelijk...
- Geen mening

**48. Vindt u het aanbod van verschillende woonsegmenten in de Stadsregio Arnhem Nijmegen (prijzenklassen) voldoende en zo niet, welke woonsegmenten mist u?**

- Ja, ik vind het aanbod van verschillende woonsegmenten voldoende
- Nee, er is onvoldoende Sociale huur aanwezig
- Nee, er is onvoldoende Dure huur aanwezig
- Nee, er is onvoldoende Goedkope koop aanwezig
- Nee, er is onvoldoende Middel dure koop aanwezig
- Nee, er is onvoldoende Dure koop aanwezig
- Geen mening

**49. Vindt u het aanbod van verschillende type woningen in de Stadsregio Arnhem Nijmegen voldoende en zo niet, van welk type woning is er volgens u een te klein aanbod?**

- Ja, ik vind het aanbod van verschillende type woningen voldoende
- Nee, er zijn te weinig eengezinswoningen aanwezig
- Nee, er zijn te weinig meergezinswoningen aanwezig
- Nee, er zijn te weinig appartementen aanwezig
- Nee, er zijn te weinig vrijstaande woningen aanwezig
- Nee, er is een ander type woning te weinig aanwezig, namelijk.....
- Geen mening

**50. Mist u bepaalde voorzieningen in de stadsregio Arnhem Nijmegen, en zo ja, welke?**

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**51. Wat zou ervoor kunnen zorgen dat u in de Stadsregio Arnhem Nijmegen blijft of gaat wonen?**

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## PERSOONSGEGEVENS

Tot slot nog enkele vragen over uzelf.

**52. Wat is uw geslacht?**

- Man
- Vrouw

**53. Wat is uw geboortjaar?**

— — — —

**54. Wat is uw huishoudenssituatie?**

- Alleenstaand
- Tweepersoonshuishouden (samenwonend/echtpaar zonder kinderen)
- Gezin met kind(eren), waarvan 1 of meer jonger dan 12 jaar
- Gezin met kind(eren), allen ouder dan 12 jaar
- Alleenstaande ouder met kind(eren), waarvan 1 of meer jonger dan 12 jaar
- Alleenstaande ouder met kind(eren), allen ouder dan 12 jaar

**55. Is uw partner momenteel werkzaam en zo ja, in welke gemeente?**

- Nee, niet werkzaam
- Ja, werkzaam in de gemeente \_\_\_\_\_
- Ja, werkzaam in het buitenland

Hartelijk dank voor het invullen van de enquête!

Deze vragenlijst is volledig anoniem. Als u kans wilt maken op een van de 5 VVV-bonnen t.w.v. €50,-, kunt u hier uw emailadres achterlaten:

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## Appendix 3: Topic list interviews

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### Intro

1. Wat is uw rol binnen uw organisatie?
2. Kenmerken organisatie: grootte, verzorgingsgebied, onderscheidend karakter

### Organisatie en de regio

3. In hoeverre voelt de Radboud een verantwoordelijkheid richting de regio? (leveren aan regionale arbeidsmarkt?)
4. Op welke manier heeft uw organisatie een rol in de ambitie om kennis in de regio te behouden?
5. Heeft u idee in hoeverre studenten terecht komen op de regionale arbeidsmarkt?
6. Waar is er nog een duidelijke mis match tussen onderwijs en arbeidsmarkt?

### Regionale samenwerking tussen onderwijsinstaties en regionale bedrijven

7. Op welke manier kennis- of expertise uitwisseling met onderwijsinstellingen/ bedrijven? (duale opleidingen, gastcolleges, curriculumvernieuwing, facility sharing)
8. Met welke bedrijven heeft uw organisatie al contact en wat voor contact/kennisuitwisseling?
9. Evalueren huidige samenwerking. Hoe is deze tot stand gekomen?
10. Welke kansen ziet u voor uw organisatie in en rondom de kenniscampussen en waarom?
11. Wat is volgens u de houding van bedrijven/onderwijsinstellingen? Staan zij open voor samenwerkingsverbanden met uw organisatie?
12. Hebben bedrijven invloed op het onderwijsprogramma Zou u hier behoefte aan hebben?
13. Wat zijn knelpunten bij samenwerking? (belangen, gebrek geld/tijd/kennis)
14. Volgens literatuur samenwerking met thematische insteek. Uw mening over deze gedachte? (focus op topsectoren)
15. Valorisatie (kennis omzetten naar commercieel haalbare producten of diensten) van kennis via bedrijfsleven?

### Rol gemeente en Stadsregio Arnhem Nijmegen; kennisuitwisseling, stimuleren ondernemerschap

16. Op welke manier heeft u al contact met de gemeente of de Stadsregio Arnhem Nijmegen?
17. Wat doet gemeente of de Stadsregio Arnhem Nijmegen voor u op gebied van:
  - Stimuleren innovatie? Ontvangen subsidie?
  - Werkt gemeente en de Stadsregio Arnhem Nijmegen mee of tegen? Wat is uw beeld van gemeente en de Stadsregio Arnhem Nijmegen binnen regionale economie en waarom?
18. Vindt u dat de koppeling tussen onderwijsinstellingen en bedrijfsleven bemiddeld moet worden op regionale schaal? Aan wat voor instantie denkt u dan? Is hier een rol voor de (regionale) overheid weggelegd?
19. Welke rol zou de overheid volgens u moeten spelen wat betreft het behoud van kennis in de regio?

## SUMMARY

In the contemporary economy knowledge is of major importance when it comes to regional economic development (Boekema et al., 2000; Venhorst et al., 2011). Local and regional policymakers are increasingly concerned about the amount of leaving higher educated graduates (Venhorst et al., 2011). A proper connection between education and the regional labor market is of major importance in the framework of 'brain-retain'. Moreover, it is the question in which ways graduates can be connected with the region. In this research it is the question in what extend the Arnhem Nijmegen City Region functions as an 'escalator region' (Fielding, 1992). Escalator regions attract young and potential people who educate themselves in this region. After graduation they move to find jobs elsewhere. The Arnhem Nijmegen City Region has the ambition to become the strongest regional economy in the Netherlands after the Randstad region (Briesen & Baeten, 2012). The region has several spearhead sectors which should make the region competitive and distinctive: Health and Technology, Energy and Environment Technology, Fashion and Design and Logistics.

The central question of this research is:

**Which factors determined the graduates' choice to stay or to leave Arnhem Nijmegen City Region after graduation and in which extend do knowledge institutions, businesses and government cooperate in the region to keep knowledge in the region?**

Four sub questions should answer this central question:

- 1. What is the current situation in Arnhem Nijmegen City Region: in what extent do higher educated stay or leave the region after graduation?*
- 2. What characteristics do graduates who leave or stay in Arnhem Nijmegen City Region after graduation have?*
- 3. What motives do graduates have to leave or to stay in Arnhem Nijmegen City Region after graduation?*
- 4. In what way are education and labor market in Arnhem Nijmegen City Region connected with each other and in what extend do different parties within the triple helix cooperate with each other within the field of knowledge sharing?*

The research is based on the most important literature within this field of expertise, an context study and a methodological chapter. The empirical part of this research mostly consists of an quantitative research. More than 2200 graduates of the Radboud University participated in this research. The qualitative part of this research consists of several in depth interviews with key persons within regional businesses, knowledge institutions and governments.

### *Regional university*

The majority of the graduates who graduated in Arnhem Nijmegen City Region grew up in other regions (74 percent). Most of them, however, grew up in neighboring regions as North-East-North-Brabant, North-Limburg and the remaining parts of the province of Gelderland. Just 10 percent of the graduates grew up in the Randstad region. There is a clear relationship between the place someone grew up in, the place someone lived during graduation and the current place of living. Relatively, graduates who grew up in Arnhem Nijmegen City Region live more often in this region (73 percent) compared to graduates who grew up elsewhere. The bond someone developed with the place he or she grew up in is a good example of 'cumulative inertia', which is caused by a network of family and friends and makes it less plausible to move (Haapanen & Tervo, 2011). Graduates who grew up elsewhere do live in Arnhem Nijmegen City Region the

most often during graduation. The region, thus, succeeds in attracting students from elsewhere (although mostly from neighboring regions). It is of major importance that students actually move to Arnhem Nijmegen City Region during their studies, since they build up a strong bond with the region during this period.

*Arnhem Nijmegen City Region succeeds in retaining graduates*

Contrary to the fear most graduates would leave to the Randstad after graduation, Arnhem Nijmegen City Region succeeds in keeping the majority of the graduates within the region. It appears that two third of the graduates who lived in the region during graduation currently still lives in the region. Graduates who got to know Arnhem Nijmegen City Region as a region to live often turn out to stay. Respondents often mention that the region offers an attractive combination between urban and green facilities. Cumulative stress, thus, does not overshadow cumulative inertia. This means that the pressure to find a fitting job does not by definition mean that graduates actually leave the region they built up a bond with. However, neither does this mean they work in this region too.

*The region has difficulties in retaining graduates on the regional labor market*

Arnhem Nijmegen City Region succeeds in retaining graduates by offering an attractive living environment. However, the region is less successful in retaining graduates on the regional labor market. Most respondents, however, still work within the region (65 percent). This percentage is clearly lower compared to other regions. This means that graduates who live in Arnhem Nijmegen City Region relatively more often work outside their region of residence compared to other respondents. However, it should be mentioned that Arnhem Nijmegen City Region is by far the smallest research region in this research, which increases the chance that inhabitants of Arnhem Nijmegen City Region work in another region compared to inhabitants of other, bigger regions.

The most important motives to leave Arnhem Nijmegen City Region after graduation are clearly career related. Many respondents mention there are too few interesting jobs in the region, there are not enough jobs for their level of education or sector. Regarding possibilities on the labor market, Arnhem Nijmegen City Region could be considered as an escalator region, since relatively many graduates work elsewhere. However, graduates do not leave the region just because other regions offer better opportunities on the labor market. As mentioned by Getler (2005), not only career related factors play a role in binding people to a region. According to him the quality of life is also very important in the framework of retaining highly educated graduates. Arnhem Nijmegen City Region seems to confirm his findings. The reason it is possible that graduates live in Arnhem Nijmegen City Region and work elsewhere has everything to do with the region's location within the country. The region could be considered as an intermediary region instead of a real peripheral escalator region as Groningen and Enschede. Arnhem Nijmegen City Region is close to other important economic areas as the Randstad and Brabant. This makes it for graduates possible to benefit from the good living environment in Arnhem Nijmegen City Region and the labor possibilities in other regions.

*Arnhem Nijmegen City Region is not an escalator region*

It can be concluded that Arnhem Nijmegen City Region cannot be considered as an escalator region. The region does attract students from elsewhere, mostly neighboring regions. Many of these students live in Arnhem Nijmegen City Region during their studies. After graduation, however, most of these students stay in the region, contrary to the expectation. Fielding's theory (1992) is thus, not applicable on the Arnhem Nijmegen City Region. A possible explanation here for is the fact that the region's location makes it possible to live in the region and work in other economic centers as the Randstad and Brabant. However, to get the best out of it, the region should pay attention to better job opportunities for high educated graduates, since most respondents indicate that they are willing to leave the region when they find a fitting job elsewhere. Graduates are thus not strictly bounded to Arnhem Nijmegen City Region, which could be considered as a threat, which should be taken into account.

