

The economic impact of the University of Zaragoza

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Foreword

This document represents the final part of my master study of Economic Geography at the Faculty of Spatial Sciences of the University of Groningen. To complete this study I have studied through the Erasmus European exchange program for almost five months in Zaragoza. Doing my research in this Spanish city have been a great and unforgettable experience. Despite the fact that I haven't chosen for the easiest way, conducting this thesis in a totally unfamiliar environment has been a perfect challenge for me and it was without a doubt the most useful, intense and valuable experience during my study career.

The first person I would like to thank is my supervisor Mr. van Steen. His help and patience has been of great value for me and the critical and useful feedback he gave forwarded me into the right direction and helped me finishing this thesis. Also I would like to thank Mrs. Escalona who guided me on behalf of the University of Zaragoza and helped me especially to come in touch with several persons for my interviews. The help of both is greatly appreciated.

Last but not least I would like to thank my parents for their continuous support not only while writing my master thesis but also during my whole study career.

Jeroen Dijkstra,

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Executive Summary

This study examines the economic impact of the University of Zaragoza (Spain). Nowadays universities play an important role in the regional development. Universities are no longer regarded only as institutions for education and research but are also recognized as important regional economic actors as well. A study about the economic impact of the University of Groningen served as the basis of this case study. In the Groningen case became clear that the University of Groningen plays an essential role on local and regional scale and that some of its economic effects can be felt at a even higher level. To compare two different universities from different countries has been an interesting challenge where both differences as similarities have been found.

An earlier report of the University of Zaragoza about the socio economic importance of the university already gave different economic figures for the university and from there this research focuses on how the university operates, explains what the underlying causes of these figures are and explores how the university is seen by various actors.

Therefore this thesis tries to find an answer on the main question: What is the economic meaning of the University of Zaragoza for the city of Zaragoza and the region Aragon? The open conducted interviews with various stakeholders of the university led to the fact that there could be outlined a complete picture of the economic impact the university has. In this the Vermeulen model is used which includes all kinds of university related economic effects to measure its total impact.

The University of Zaragoza contributes in several ways significantly to the economic development of the region. With high numbers of direct and indirect employment, local expenditures and the supply of high educated the university is directly responsible for an economic impuls in the city of Zaragoza where it is located. Further is the university by far responsible for the largest share of the total number of R&D activities in the region. The university uses their knowledge in various (innovative) ways and it has a close relationship with the local industry. Local companies not only mention the importance of the university in the supply of a high educated labour force and its value in R&D collaborations but even claim that the university is an important keep factor for (their) companies. The economic effects of the R&D of the university have mainly local impact which is in contrast with the University of Groningen where the impact goes also to a large extent beyond the local scale. Both the University of Groningen as well as the University of Zaragoza have an important contribution on regional scale but this is due to various reasons. In the Zaragoza case this is mainly because of the fact that the university is also located in other places in the region while in the Groningen case the regional importance is more 'naturally'. Further is citymarketing an important tool in the Groningen case to improve the (student) city image in contrast to the Zaragoza case where the citymarketing only uses the university to a small extent.

To enlarge its economic impact in the city and region the University of Zaragoza faces difficult times. Where the financial support from the government is getting less and the costs go up, the university should have to work hard and be creative to maintain its prominent position in the society. However this research will show that the university uses its knowledge in many different ways to benefit its society and therefore it should be able to handle this challenge despite the difficult current times.

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1. Background

1.1 Universities

The word university is derived from the Latin ‘universitas magistrorum et scholarium’, what more or less means ‘community of teachers and academics’ (paralumun.com). The universities as we know them nowadays have developed a unique culture based on a long and quite unusual history. ‘During the Middle Ages, between the twelfth and thirteenth centuries, in certain European towns, mostly in Italy and France, a peculiar institution of higher education developed to a level of organizational and educational complexity to be considered the ancestor of the modern university’ (Geuna, A. 1996). Universities such as Oxford University and the University of Paris are some 800 years old, making them amongst the oldest institutions of any type still surviving and still flourishing today (usq.edu.au). The origins of universities even predate these ancient institutions, being able to be traced back to an institution established by Plato in ancient Greece and to the colleges to train government administrators in ancient China (usq.edu.au).

A century ago universities, developed according to British models, functioned as, what some described as ‘finishing schools for gentlemen’, serving only men from the elite social class and preparing them for leadership roles in a very conservative and structured society. The ‘ivory tower’ image of universities (which saw universities as being remote from society) was predominant (usq.edu.au). The Second World War experience proved the value of science and technology to economic development and formed the basis for post-war industrialisation. The university transformed and the elite institution that it was has become a mass institution, mostly but not only concerned with research and training. Due to its success both in research and in teaching, the university has grown in number of students, number of researchers and in financing. In particular, after the Second World War its rapid growth was also connected with a rise in society’s expectations for economic returns (Geuna, A. 1996).

Research, knowledge generation and innovation became synonymous with the modernisation and universities were recognised as being able to contribute significantly to this movement. Higher education became seen as a prerequisite for an increasing range of professions. The rigid social class system broke down and in the good economic times of the 1950s and ‘60s more people wanted to access a university education as a means of social and vocational advancement. From 1950-75 more universities were built and a system of colleges of advanced education was established to provide ever-increasing higher education opportunities to an increasingly diverse cross-section of society. During the process of expansion, the university sector has changed from being an elite to a mass education system. Where once the student body drew from a narrow elite segment of society, universities now serve all of society. Where once universities provided what was referred to as a ‘general liberal education’ and were involved in training in only the more elite vocations such as medicine and law, universities now prepare graduates for work in a wide variety of vocations from business, teaching and nursing to tourism/hospitality and journalism (usq.edu.au).

1.2 Importance of universities

Nowadays the importance of universities is acknowledged worldwide. That universities have a critical role as sources of intellectual property and talent in regional development and high technology industries is known for already a long time. But more and more universities are nowadays no longer regarded only as institutions for education and research but are also recognized as important regional economic actors as well. They can act as partners of local governments and private firms in the process of regional economic growth and even play a key role in what is presently conceived as ‘the learning region’, that is to say the relation between knowledge creation and economic development of firms and regions in regional networks (Galema et al., 2007).

Several studies have shown that the presence of students is becoming more and more a key factor in the development of cities. An important conclusion in this is that in the knowledge economy and especially in high-tech and creative industries, people no longer follow jobs but jobs follow people. Understanding this has led to the emergence of new and stronger links between the city and its university and helped build a regional innovation system that connects the university, public authorities and business and industry. According to Swinney (2011) nowadays a university can have a massive economic impact on the economy of its city through its local employment and the spending but also through interaction it has with the local business base.

However also a lot of studies conclude that the university as a regional booster should not be taken for granted. “Close but often random and unconstructed links between higher education and local and regional competitiveness are not that unusual as the Organization for Economic Co-operation and Development's (OECD) study of higher education's role in local and regional economies shows” (Ischinger and Puuka 2009). Regions can, with the help of their colleges and universities, play a key role not only in the development of national but also local and regional innovation systems. But much more needs to be done to take full advantage of higher education in regional and city development. It is becoming clear, for instance, that imitation and adaptation are no longer sufficient strategies in this kind of work. Unique advantages have to be constructed, and they have to be built on innovation. Universities and colleges can and should play a proactive role in providing the ideas and strategies to fuel that innovation, Ischinger and Puukka conclude. The same is concluded by Galema et al. (2007). They give as example that US studies have shown that several high-quality universities, such as Berkeley, Columbia, Chicago, Harvard, and John Hopkins, have not played a role as incubator for high-tech industry in the region. On the other hand there are also a lot of success stories like the “Cambridge phenomenon”. In this “university” high technology centers illustrate a relatively new fact: the existence of knowledge based local economic development.

1.3 Zaragoza and the Aragon region

Looking at Spain the (growing) importance of universities is also acknowledged. One of the biggest cities in Spain is Zaragoza. With 680.000 inhabitants it is ranked as the fifth biggest city in Spain. Zaragoza is strategically situated between Barcelona and Madrid, Valencia and Bilbao. It is the administrative and economic capital of the Aragon region, a large and sparsely populated area of more than 1.3 mil. inhabitants. Aragon is one of the seven autonomic regions ('comunidades autónomas') of Spain. Together with Huesca and Teruel, Zaragoza is one of the three provinces in the Aragon region. Aragon has an area of 47,720 square kilometres. The province of Zaragoza is the one which covers the widest area with 17,274 square kilometres, followed by Huesca with 15,636 square kilometres and Teruel with 14,810. In relation to size, Aragon is the fourth largest autonomic region in Spain and occupies 9,42% of the Spanish territory (internationaledu.net).

The provinces of Aragon are subdivided in 33 'comarcas'. These small municipalities have normally less influence and (political) power. The relatively big 'comarca' of the city of Zaragoza has however significantly more influence and power as the others. In the last decades, the city of Zaragoza has maintained its strong position as an industrial region and it is the fourth biggest local economy in Spain (zaragozacommittee.net).

In recent years, the city is confronted with major changes. One of the most important developments is the improved rail link with Barcelona and Madrid. Zaragoza is now connected to the high speed link that connects the two urban powerhouses of Spain. This has affected the geo-economic position of the city, and offered a number of new opportunities, but also threats. The high speed train affects the city's external accessibility and also offers scope for urban transformation in the city centre (Van den Berg et al. 2005). In the summer of 2008 Zaragoza hosted the Expo, a world's fair on water and sustainable development. The Zaragoza Expo has left in its wake a city which has made a big transformation. Brand new infrastructures, green areas, leisure facilities and cultural centers were some of the results of hosting the event (spain.info.html).

On national scale the Spanish central government has committed itself to meeting the Lisbon challenge, which implies an increase in spending on higher education and R&D. Furthermore, on a national level the Espana.es programme is relevant. This is a major action plan for the development of the information society in Spain. It aims to give strong impulses to the ICT sector, to raise awareness of the importance to society, to improve ICT education and to ensure access to ICT for all citizens and SME's. In Spain, the regions enjoy a high level of autonomy. They are important players and are responsible for education policies, innovation policy and lately also for higher education policy. In the Aragon region the two most important action plans to promote the transition to the knowledge economy are the Walqa initiative (a set of plans to promote e-business, create ICT centres and invest in telecom infrastructures) and InnovaAragon (a project to improve links between science, technology and companies to promote innovation, which supports cooperation between firms and universities and supports the exchange of good practice).

In 2003 the municipality of Zaragoza presented a comprehensive knowledge economy strategy named 'Zaragoza towards the knowledge society' to promote the knowledge economy. It is an elaboration of Zaragoza's more general Strategic plan which was drawn up in 1998 and points out the main directions for Zaragoza's future development. Key elements are economic diversification (notably towards a more services and information oriented

economy) and an improvement of the utilisation of the existing knowledge base. This strategy contains an extensive programme of actions directed at fulfilling these aims.

The plan has full backing from all these sectors and was drawn up in close collaboration with them. Several elements of the strategic plan refer to the need for a shift towards a knowledge economy: Zaragoza should offer an attractive environment for firms, based on innovation, quality and environmental sustainability and should seek to create an effective infrastructure to link markets, firms technology and research throughout the region (Van den Berg et al. 2005). The Ebropolis 'Milla digital project' is a part of the plan and intends to create in Zaragoza an area of innovation and knowledge, located in the city centre. This development is catalysed by the arrival of the High Speed Train, the urban land that becomes available due to the construction of a new station, and the Expo 2008 project (zaragozacommittee.net).

The economy of Aragon

At the beginning of the 21st century Spain had a sustained economic growth. The GNP of the country continued to grow in the years 2006 and 2007 and the country reached almost 4% growth per year, what was about twice the average of the other European countries. In the end of 2007 also Spain was hit by the economic crisis that skipped from the U.S. This led to an unprecedented high unemployment mainly due to the collapse of the Spanish housing market.

The economy of Zaragoza is dominated by services activity, but less than many other cities of a similar size. Major business service companies consider the market in Zaragoza too small and prefer cities as Madrid and Barcelona to open up branch offices. The city had a relatively strong manufacturing sector. For instance big companies as Opel and Siemens have got large plants in Zaragoza and offer a lot of employment. An important and emerging branch in Zaragoza is the logistics and transportation industry (Fundear.es).

1.4 University of Zaragoza

The University of Zaragoza, also called Saragossa University, is an institution located in the Aragon region of Spain. One of the oldest universities in the world, it was founded in 1542 and has over 34,000 students and 22 faculties. The university has a ranking among the top universities in Europe. It is located in the heart of Aragon and was funded by the Government of Aragon "Diputación General de Aragón" and the Government of Spain, making it a top public university in Europe. The activities of the university spread along Aragon's three provinces, with research centres and teaching campuses located in Zaragoza, Teruel and Huesca. The University of Zaragoza is one of the 70 universities in Spain. Spain has about 1.5 million university students what is quite a lot for a country with 42 inhabitants (justlanded.com).

In 2011 the University of Zaragoza brought a report named: "The social economic contribution of the Zaragoza University". The University of Zaragoza is the only public higher education institution in Aragon that is related to the economic development and welfare. In this report the economic and social impact from the daily university activities on the economic and population is measured. The activities of the university, the economic environment and the economic impact of the university are the main parts of the research. The report concluded that the University of Zaragoza contributes significantly to the socio economic development of the Aragon region.

1.5 The Vermeulen method

The model of economic functions of institutes of higher education and their spatial scope (Vermeulen 1996).

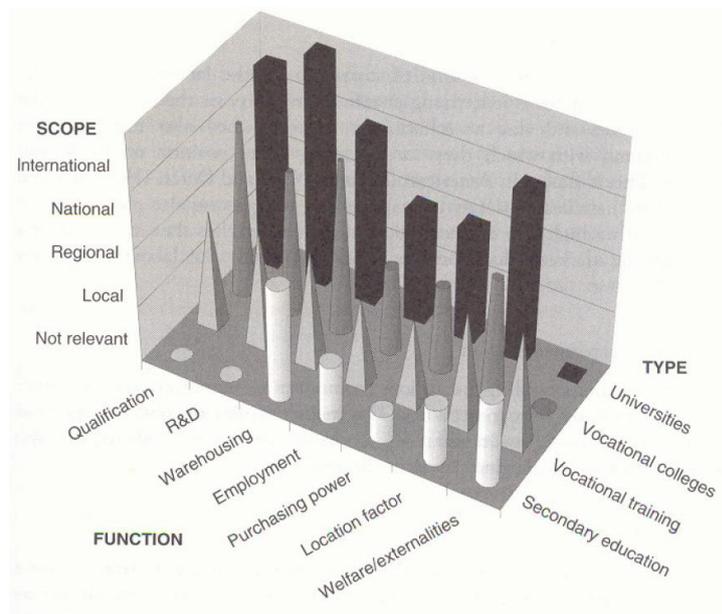


Figure 1: "The Vermeulen model"

To map what the economic meaning of the University of Zaragoza for the city is, the university part of the model from Vermeulen (1996) can be used. There are many different models which describe the economic impact of universities and most are similar in some kind of way even though they differ in some aspects from each other. The Vermeulen model is a model that reflects clearly the various aspects of university impact. The model measures three university functions with a certain type of effect and scope namely, school (teaching) as input effects, laboratory (research) as output effects and enterprise (business) as attraction effects. Within these three categories several quantified functions are scaled. The quantified functions of the University in the model of Vermeulen are: employment effects, purchasing power, R&D effects, qualification effects, warehousing effects, location effects and welfare effects and externalities.

Groningen

The model from Vermeulen is used by Galema, Peterson and Pellenbarg (2007) and applied on Groningen (The Netherlands), to measure the economic meaning of the University of Groningen (28.000 students) on the city of Groningen. Groningen has around 190,000 inhabitants and is the main city in a regional city network with 450,000 inhabitants. The city of Groningen can be identified in many ways, but first of all it is a student city. Of the nearly 50.000 students currently enrolled at the University of Groningen and other institutes of higher education, an estimated 35.000 to 40.000 live in the city. As a consequence, one out of five inhabitants are students, which is quite exceptional for European middle-sized university towns (Snijders et al. 2009). By investigating the quantified functions from the University of Groningen the main conclusion from Galema et al. (2007) is that the university seems to have a good economic impact on the region and it seems to be growing. This impact becomes especially clear in the employment, purchasing power, and location effects in Vermeulen's model. They describe the city of Groningen as a "capital in the region". Further a lot of people

have a positive association with Groningen and the university which is part of the external effects. At last it should be noticed that the academic hospital (UMCG) is an important part of the university activities.

1.6 Research problem

More and more universities are becoming important engines of local and regional economic development. The universities of Groningen and Zaragoza, each functioning as the only university in their city and the surrounding region, appear to have important economic functions for their local and regional economies. Zaragoza is the fifth biggest city in Spain and the University of Zaragoza has about 34.000 students. It is really interesting to map the economic effects and establish the economic importance of Zaragoza University for its city and local environment as well as how this can be compared with the results for the smaller University of Groningen.

1.7 Research Goal

The main goal of this study is to estimate the economic impact of the University of Zaragoza in Spain for the city of Zaragoza and the Aragon region, partly by means of a comparison with studies already done on the local/regional economic importance of the University of Groningen (The Netherlands). A secondary goal is to explore how the University of Zaragoza is used or could be used as part of the place marketing and local economic development policies of the city of Zaragoza.

1.8 Research Questions

- 1.a. What are, according to the literature, the most important functions of a university for the city/region where it is located?
- 1.b. What are, according to the literature and past studies, the most important variables to take into account when estimating the economic impact of a university?
2. What is, according to past studies, the importance of the University of Groningen for its city and surrounding region?
- 3.a. What are the most important functions of Zaragoza University for the city/region where it is located?
- 3.b. Is the University of Zaragoza indeed a regional booster? If so, why?
- 3.c. To which extent is the university used as a part of the marketing/promotion of the city of Zaragoza?
4. How does the University of Zaragoza function compared to the University of Groningen in terms of local and regional economic importance?

1.9 Research approach/methodology

The first part will be answered on the basis of a literature study. The product from this part is a theoretical support that lays the foundations for the empirical research. In this the important functions of a university will be given and the variables which are used in this thesis to estimate the economic impact of a university are explained.

Chapter 3 looks at the importance of the University of Groningen for its region. The University of Groningen is chosen because of the fact that it is the home university of the author of this thesis and there has been usable research done to it. With the theoretical knowledge that is gained, a number of hypotheses are developed in chapter 4. These hypotheses set out a number of expectations.

Chapter 5 describes what the main functions of the University of Zaragoza are and investigates if the Zaragoza university is indeed a regional booster and why. The chapter continues with describing the citymarketing of Zaragoza and the contribution of the university in this. The chapter ends with answering/testing the hypotheses which are formed in chapter 4 and in this way all the research questions will be answered. In chapter 5, the performance of the University of Zaragoza will be investigated by means of a combination between secondary literature and a qualitative research.

The University of Zaragoza is approached as a case study and the model from Vermeulen (functions and regional scope of education, 1996) has been used to research its importance. Also a part of the model “Classification and examples of regional effects of a university” (Florax 1987) and the Triangle model (Florax 2007) will be used. This means that the economic functions as well as the social and cultural meaning of the University of Zaragoza will be investigated and in this way the research questions can be answered.

In the qualitative research, 15 interviews have been conducted with various stakeholders. These are both actors involved in the functioning of the University of Zaragoza as well as people from the government of Zaragoza, the marketing department of Zaragoza, companies and other stakeholders. In this way an attempt is made to get a look at the University of Zaragoza from all sides. Further a small survey/short questionnaire is set up to ask people of companies how they look to the University of Zaragoza and they have been asked if the University of Zaragoza is important for their company. All stakeholders that have been interviewed are more fully described in Appendix 1. Then in Appendix 2 the general asked interview questions can be read. In most cases, these questions are not asked point wise but have been discussed through a conversation. In addition there have been asked also in most interviews more specific questions. Furthermore it was not always necessary to ask all the questions as prepared because of the fact that they were already discussed at a previous question. The survey has been sent to 50 companies but the response was unfortunately low. Only two companies replied by mail. At a meeting of CEZ (Confederación de Empresarios de Zaragoza) for companies, seven more companies have filled in the questionnaire. In Appendix 3 the survey can be found and Appendix 4 shows the names of the companies and their answers.

Chapter 6 covers the conclusion and in here the main question ‘what is the economic meaning of the University of Zaragoza for the city of Zaragoza and the region Aragon?’ will be answered. Further this chapter describes some implications of the findings and contains a reflection on the research.

2. Economic impact of universities

2.1 Introduction

In this chapter the importance of universities in society will be described. To do that there are a lot of things to keep in mind. The university is an institution that doesn't allow itself to be caught in a simple description which is easily measurable with only a few important criteria. For that reason first the different functions that a university has will be described in section 2.2 after a number of important facets of the contemporary world in which the university has its place are given. In the section 2.3 the variables that are taken into account to estimate the economic impact of a university will be discussed and put up as a framework to have a good overview how university impact can be measured.

2.2 The university in the contemporary world

Universities are not anymore only education and research institutions. Their importance increased over time and so did their functions. There are even cities nowadays where the university is that important that they are appointed as a 'university'. In this part the 'university' will be defined and will be explained when a city is a 'university' or has some characteristics of an 'university'. To decide what are the most important functions of a university and to investigate the extent to which the functions of a university influence the city or region it is located in, it is important to first give a look to the city-university relation. Further the functions of the university have to deal with a changing society. To have a good picture of the university functions in a city/region it is necessary to understand the context in which they exist. The functions of the university will be divided in two main groups which both have some subgroups which are closely related to each other and cannot be seen inseparable from one another because they overlap in some aspects.

'University'

'Student-towns', 'college-towns', 'university-towns', 'university-cities'. Some examples of the labels that people give to cities only because of the fact that there is a university present in the city. The question is, is every city with a university actually a 'student-town', 'college-town', 'university-town' or 'university-city'? Is it justifiable to call every city with a university like that or are there more conditions needed to call a city a 'university-city' and does it maybe depend on the importance of the university for the city? It is difficult to measure exactly the complete influence from a university on its city but to call every city with a university a 'university' is too easy. When are the city and its university so inextricably linked with each other that it is justifiable to call the city a 'university'?

The overall opinion is that a 'university' or 'college town' is a community (often a separate town or city) which is dominated by its university population. 'Universities' or 'college towns' are in all cases called so because of the fact that the presence of the educational institution(s) pervades economic and social life. Examples in this are that many local residents may be employed by the university (which may be the largest employer in the community), many local businesses have close ties with the university and the student population may sometimes even outnumber the local population. In this the economy is closely related with the university activity and highly supported by the entire university structure, which may include for instance university hospitals and clinics, libraries, student societies and suchlike. Moreover the history of the city is often intertwined with the history of the university itself.

According to Gumprecht (2003) the (American) college town has been significantly overlooked by geographic study. Gumprecht has stated that the geography of college towns is “almost totally terra incognita”. Gumprecht describes the American college town as a “unique type of place, shaped by the sometimes conflicting forces of youth, intellect, and idealism”. Further college towns typically create and exert a dominant influence over the character of the town (Gumprecht 2003). While there is no exact measurement for the amount of influence that is required in order to designate a place a college town, these unique geographies possess certain subjective and unquantifiable characteristics that make them entirely distinguishable from other types of communities. Gumprecht (2003) gives some criteria to evaluate the college influence on a town which can be taken into account as an indication. The following questions can be asked; Is the university the largest employer in town? What is the enrolment of the university compared with the population of the city? What percentage of the labour force works in educational occupations? Further a college town has the characteristics of being a youthful place, having a high percentage of high educated people, having relative high family incomes and low unemployment and being a transient, unconventional and comparatively cosmopolitan place.

The distinction between a college town and a city that is merely home to a college is however not very clear. Beyond mere qualitative measures, Gumprecht suggests that if the number of college students in a municipality equals at least 20 percent of its total population then a collegiate culture is likely to exist. Other quantitative factors, such as the share of the labour force that is affiliated with the college and the portion of the total share of land area owned by a university have been suggested as viable statistical measures to quantify the extent to which a community is a college town (Souhrada 2009). Gumprecht considers college towns mainly as an American phenomenon. He indicates that nowhere else in the world so many towns are so dominated by colleges and universities as in The United States. In most countries and especially in those in Europe the majority of institutions of higher education are in large cities and national capitals, where they are located in regional centres that are economically too diverse to be considered as college towns.

Lederman (2008) states that a place doesn't have to have several prestigious institutions for it to be considered a college city, but nevertheless when an institution is in an urban area, it can nevertheless make a decisive mark on a city. Prominent academic hubs can infuse culture and economic opportunities. The cities that are “naturally diverse” in population and are able to offer a range of cultural amenities like theatre and museums prove to be most appealing as a college city, certainly when they are also ‘college centered’. So according to Lederman the prototypical college town combines the academic reputation of the colleges with the cultural amenities and regional density (with a high percentage of high educated young people). There is no single definition which makes very clear what a college town is and what is not. Even though with the soft conditions as described above it's possible to decide if a city has got some or many characteristics of being a student city. By studying these characteristics the social importance of a university on a city can partly be explained and can form a part of the economic importance of a city. Also Florida (2011) recognizes that college towns can not be described just as sleepy hamlets where learning, sports, conversation, and partying prevail. He even says that the characteristics of college towns nowadays go beyond the soft conditions as mentioned above. ‘The rise of the idea-driven, human capital powered knowledge economy has transformed many of them into economic powerhouses’.

Relation city and university

To describe the most important functions of a university for the city/region it is sensible to give first a look to the relation between the university and the city/region. All over the world there are different kind of relations between universities and its region. When the university and the city/region don't have a good relationship or (hardly) no relationship at all, the functions of the university will have a complete different meaning than if the opposite is the case. To fully benefit as a city/region from the positive effects of the functions that a university has, it requires a good relationship in which both actors mutually support each other. The relationship between the city's non academic population (town) and the university community (gown) is called a 'town-gown' relationship in literature (Paola 2011). The metaphor is primarily used to describe the ancient relationships but also used to describe nowadays modern university towns. In most cases the university and the city/region work well together (or at least try), though there's often room for improvement. Most cities understand that it is of interest that they work together to make the city attractive as well in the imaging of the city as in real life.

Tensions in town-gown relationships are not uncommon. Mostly because of the fact that locals felt anger about the university's privileges, wealth and its power over the town. Further they resented the student 'foreigners' for descending 'their town'. Perceptions and misconceptions are in most cases the main reason for a possible difficult relation and often there is then a disconnect between how the students and the locals feel about themselves and about each other (Paola 2011). The most extreme negative case in the town-gown relationship is when there is a rivalry. In this situation the academic institution has an acrimonious relationship with the town which surrounds it. Although some literature says that these rivalries have existed ever since formal institutions of higher education were formed and they will continue to be a very serious issue in some communities, the time of town-gown rivalry lays mainly behind us. There will always be some tensions between town and gown but real town-gown rivalries don't exist anymore (WisegEEK.com).

Mainly because of institution's positive economic impact on the towns, any possible tensions will be taken for granted. Taylor (2002) states that the success or failure of a complicated town and gown relationship almost always seems to boil down to one factor: communication, how well the parties it do, how often, through what vehicles and for what purpose, etc. However most relationships between city and university are positive in essence because of the benefits that a university has for the city.

Consequences of changes in the world for universities

If we describe the functions of the University for the city/region where it is located we can't ignore the changing society because also the university is experiencing these effects. Universities all over the world should respond to new demands from the market, community and the state with a variety of new programs, policies and products like they always have done the previous decades. Within a more and more unpredictable and competitive world, the university should nowadays be aware of events and trends outside the university according to De Meret (2007). The processes of climate-, demographic- and economic change, globalisation, innovation, urbanisation and the rise of new emerging powers have a big influence on the functioning of universities. The more interdependent and unstable world leads to consequences on university level. The most important consequence is that universities are becoming competitors of each other and ranking is becoming more and more important. Forced by mass higher education universities have to become more diverse, more global and much more competitive. (Wooldridge 2005) This is called the brain business. In this field of competition marketing is also becoming increasingly important for the universities.

Another consequence is that more and more actors are involved in the functioning of universities. Universities have to deal with growing expectations from society and universities are a crucial part in the rise of the knowledge economy. Than we haven't even noticed the (growing) group of all the other stakeholders with whom the university has to deal with. For example the process of internationalization makes that universities have to deal with education research which is imported for other countries. A last consequence is that less investment by the state (but more interference), makes that universities become more dependent to generate new revenue through student fees, entrepreneurship, fundraising, and partnership (De Meret 2007).

Knowledge city/region

The knowledge city/region (is a definition that) already passed by in this thesis and it can't be seen separated from universities anymore. The term is used more and more nowadays and its importance is increasing in the globalizing and changing world. But what is it exactly? And what is the importance of university in this? The term of the knowledge city will be used within the definition of the knowledge based economy. However there is not one common definition of the knowledge based economy. Here we use the definition of the OECD which describes the knowledge based economy as follows: 'The knowledge based economy is an expression coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors'. (OECD 2005)

Logically the term knowledge city/region describes the same trends but then on a lower scale. Mainly the knowledge is produced, processed, exchanged and marketed in cities. The term 'knowledge city' is short hand for a regional economy that is driven by high value-added manufacturing and services created through research, technology and human capital. Further knowledge cities can be characterized as having highly-skilled and educated labour forces, networks of global business influence and research excellence, outstanding infrastructure for connectivity to global markets and market access regimes that encourage high levels of international trade and inward investment. Their education and social systems foster openness, tolerance and merit-based cultures (Delgado Carillo 2010). To appoint which cities are successful in the knowledge economy is not easy because it is difficult to define what falls within its ambit. It can be argued that all capitalistic economy is a knowledge economy (Van

den Berg et al. 2005). The definition is interesting because of the fact that within the knowledge city the role of universities is becoming more and more important. Universities are providing the intellectual workforce and are the engines behind technological innovation which are two main components of the knowledge economy. In that knowledge economy the reliance on intellectual capabilities even continues to grow (Powell and Snellman 2004). The knowledge economy and universities can't act and be seen without each other. Universities take a crucial and increasing prominent role in contemporary economic processes.

The Cambridge phenomenon

The Cambridge University is a classic example of a university that is important for the region. Thirty years ago Cambridge was a market town with a population of 100,000 people. The city housed a world class university but very little entrepreneurial business. In the course of time many Cambridge university graduates stayed in Cambridge and founded a range of high-technology companies (mostly computer-related) and this attracted others and related developments. The origins of many firms (through both direct and indirect routes) can so be traced back to the university and the local research community. Cambridge and its surrounding area has become a high-technology cluster economy focused on computer hardware and software, scientific instruments, electronics and biotechnology. Academics, entrepreneurs, business and support services have combined to create an environment that encourages and enables the formation and growth of high-technology companies. Cambridge is known for its strong links between firms, the university and research organizations. (Herriot 2007)

The impact the Cambridge Phenomenon has on its region is massive according to the statistics. The region's population grew by more than two percent in the 20 years from 1981 to 2001 and is now amongst one of the wealthiest sub regions in the United Kingdom. More than 40.000 people are employed in knowledge based businesses. They are spread out over about 1.500 high-technology companies. The focus on the city is really strong, with 34 percent of the jobs based in the city and an additional 39 percent in nearby south Cambridgeshire. (Herriot 2007) 'The Cambridge Phenomenon' has driven growth in the local and regional economy and therefore it is maybe one of the best examples of a knowledge economy where there's a good combination of leading science and technology from within the university together with the local business. The university has an unprecedented influence on the city and the region. It is impossible to see the city and its region in their reputation and functioning separately from the university. From this exceptional example it is interesting to do further research to the functions and the influence on a region from a university.

Functions of a university

To identify what functions the university has for the city/region where it is located, functions are categorized in this thesis. It is sometimes difficult to identify functions because of the fact that there are some aspects that sometimes overlap several functions, or can also be scaled for some part in another function(s). Also functions can be seen separated from one another as well as joined together because functions are often closely connected to each other and overlap each other in some aspects, so these choices of categorizing will be discussable. Naturally these choices will by means of an argumentation be explained as clear as possible. As a guideline Badat (2009), De Maret (2007) and Thomas (2007) are used. In this thesis the functions have been split up in two groups. In the first group the functions of the university are classified which are important to the economy of the city/region. In the second group the functions are classified which are important to the social and cultural welfare (of the people) of the region.

<p>MOST IMPORTANT FUNCTIONS UNIVERSITIES:</p> <p>Importance for economy</p> <ul style="list-style-type: none"> • Education institution <p>-Education -Teaching training -Critical inquiry</p> <ul style="list-style-type: none"> • Research institution <p>-Research and the transfer of knowledge and technology</p> <ul style="list-style-type: none"> • Actor in the local economy <p>-Employment and expenditure function</p>	<p>Importance for social and cultural welfare</p> <ul style="list-style-type: none"> • Service to society <p>-Collaboration with the health care sector -Invest in local infrastructure</p> <ul style="list-style-type: none"> • Social function <p>-Create a regional identity -Ambassador function</p> <ul style="list-style-type: none"> • Cultural function <p>-Cultural events and lectures open for public -Boost for the cultural offerings and liveliness</p>
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Figure 2. University functions (own interpretation literature)

Importance for economy

- *Education institution*
- Educate

Research and education are the two primary functions of a university and the two main products that a university produces. The university was originally created for the fundamental purpose to be an education institution. Quality education should be the first priority of universities from undergraduate to post-doctoral level. Badat (2009) describes the university education (function) as the dissemination of knowledge and the formation and cultivation of the cognitive character of students. He argues that it is important to not only disseminate knowledge to students but also induct the students into the making of knowledge. The university is there to prepare young people intellectually and personally for their future life and give them skills that will equip them for the workplace of the 21st century. A part of the graduated students (with advanced degrees) will stay and work in the city/region where the university is located at and this is highly advantageous for the local/regional economy.

-Teaching training

Although it's closely related to the overall function of education it is good to mention the function of the university to train students to become teachers in higher education. Universities are specialized to train students professionally at university master level and students will be trained during their university teacher training in teaching a specific subject to students in secondary education. They will be specialized in teaching methodology and develop all the skills associated with the teaching profession in a manner consistent with their academic training and skills. Eventually this ensures the (local) replacement of retiring teachers and ensures a high local level of education qualities.

-Critical inquiry

Critical inquiry is an important university function. Because of the large amount of existing knowledge in universities, they do not only respond to society's needs but also contribute to its evolution. Universities are leading the way in some areas. They preserve space to promote the free pursuit of rational inquiry, they nurture the debate culture and preserve a space for critical and independent thinking (free from ideological political, economical, religious or politically correctness constrains) (Badet 2009). These characteristics keep the city/region lively and will have a positive influence on the social life because of their critical view on the city where the university is located. According to Thomas (2009) universities give sense to the social and cultural aspects of the city and the region and they engage in improving society as well as holding up a mirror to it.

- *Research institution*

-Research and the transfer of knowledge and technology

Research also known as knowledge creation was together with education as mentioned one of the first ambitions of the university. Universities are creative institutions and are the research-engines of the society and for their region/city where they are located because of the fact that they create the new knowledge. Society and the region/city where the university is located can benefit from all the innovations that come from universities and therefore research is one of the main factors in promoting local economic growth and development through the presence of a university (Thomas 2002). Some of the main results of the research and development activities of the university for the region/city where it's located are the attraction of industrial laboratories to the local area, the start-up of new high-tech businesses, and any competitive advantages enjoyed by local businesses when their technology is advanced by university research. So research is not only the publishing of scientific results but nowadays especially also the transfer of knowledge and technology to (local) business and collaboration with the knowledge economy.

- Actor in the local economy

-Employment and Expenditure function

Universities are large employers and in some cases the university is even the largest employer in its city or region. Also universities spend a lot of money in the local economy to purchase goods and services. Like many other organizations these direct expenditures also generate two types of additional indirect spendings. Corporate spending by the vendors who supply (sell) goods and services to the university, and

consumer spending by the university's own employees, and the employees of its suppliers. In turn, this spending also generates jobs and employment opportunities in the region (Boston University, 2009). Even though universities are not created with the intention to create jobs or to be an (important) actor in the local economy nowadays universities are recognized to sustain the local economy because of these functions.

Importance for social and cultural welfare

- *Service to society*

-Collaboration with the health care sector

A common phenomenon is that universities collaborate with hospitals not only to ensure the best health care but also the best teaching and research opportunities for the professionals. University health science faculties and hospitals share common interests in education, research and clinical practice and depend on one another. A common feature from these relationships is the presence of university hospitals. A university hospital is an institution which combines the services of a hospital with the education of medical students and with medical research. These hospitals are typically affiliated with a medical school or university faculty and are a good example of how city and university can collaborate. These collaborations are a reaction to developments in the society and in the care sector which require more attention for knowledge development. The main task is to increase the knowledge on medical specialist care and to enhance translating this into concrete innovations. (Ministerie van volksgezondheid welzijn en sport 2006)

-Invest in local infrastructure

To ensure quality education, universities require a learning environment that is based on a quality infrastructure and a holistic array of student services that includes central resources as well as social and cultural spaces. To thrive and stay competitive as a university it is vital to keep upgrading, expanding and/or building new university buildings, equipment and facilities. The money for these investments in infrastructural enhancements comes from national and provincial governments and other sources which supports the university activities. These investments have knock-on effects in many sectors like the local planning, architectural, building and legal services to name but a few. A region or a city can so make profit through the presence of a university and benefit economically because of the fact that universities are advantageous for society and often generate financial support from national and local government to upgrade the university environment (Thomas 2009).

- *Social function*

-Create a regional identity

One of the social functions is that the presence of a university can contribute to a regional identity. This is more often the case in smaller cities and the real college towns. The university can make that the inhabitants of a city share the common feature of the university presence and make them feel that they all live in a lively city with good living conditions from which people from outside the region have a positive image. They are proud of their city and are proud to call their city a college town for the reason of the positive images that are related to being a college town. Some cities even adjust their city marketing to enhance this phenomenon.

-Ambassador function

The university can have the role of an ambassador for the city or region where it is located. The presence of the university can lead to (more) awareness of the city abroad or in its own country which in turn is positive to attract (foreign) companies or tourists for example. There are several reasons behind this. At first university can organise cultural activities which are of great benefit to the community. Further university activity like remarkable scientific publications often brings the city to the notice of the national and international press. Also through the presentations which academics make all over the world 'their' city or region gains free publicity. These academics are in this way massive ambassadors for the city and also have multiple networks, both political and commercial, throughout the globe (Thomas 2009). For universities it is often really important to attract foreign students partly due the fact that they can be ambassadors in their country/city when they return home, when they speak positive about their study in a city/university abroad. At last famous persons can be an ambassador of a city because of the fact they studied at the University of that city and can act as a 'role model'. Nevertheless it is important to ensure that these opportunities for (free) publicity are used in both the university's and the city and region's benefit because this is not naturally.

- *Cultural function*

-Cultural events and lectures open for public

It is already mentioned before but university can organise cultural events and lectures which are open for public. This is a social function which benefits people from out the city/region which are interested in such kinds of activities. Because of the university there will be a wider range of cultural events which makes sure that all kind of people will find something that interests them.

-Boost for the cultural offerings and liveliness

The most important social function of the university is that it gives the city/region a boost in cultural offerings and liveliness. The main reason in this is the presence of the student population. Students contribute to the city by giving it vitality. Students are found frequently in the town to shop, eat or enjoy the nightlife. This demand increases in general the supply of the cultural offer in the city. In this the relationship between the city and university is essential so they must work together and are dependent on one another to keep the city attractive. The city must for instance guarantee enough student houses, a good cultural offer, good shops and good open spaces where the university on the other hand can strengthen the liveliness by showing the willingness in cooperating with other parties at innovative initiatives.

2.3 The variables to estimate the economic impact of a university.

Many studies attempt to answer the question of how important a university is for a region and what the exact meaning is of having a university in a city. In this of course the economic side of the question is often taken into account. Nevertheless there is not one single commonly accepted method or model to estimate its economic impact. Even though some studies are quite similar every study has its own variables and perspectives it takes into account. Some parts of the economic impact of the university are very easy to measure where on the other hand there are effects from which there is a strong presumption they exist because of the presence of a university but it is difficult to prove this exactly. Especially the derivatives of the positive social effects are very difficult to express in economic gains and/or benefits for the region. Nevertheless it is important to try to appoint these derivatives because of the fact that the importance of the presence of the university goes further than only the direct economic effects from for instance the spending of students. There have been a lot of different studies attempting to calculate the economic impact of a university. Mainly due to this fact there are a lot of different views and meanings about this subject. Here we will explain various concepts from the literature but use only a few models and the most important variables to calculate this impact.

To map what the economic meaning of a university for it's city is, the model from Vermeulen (1996) is the main model to take into account. This model focuses particularly on the economic effects of the presence of a university and is therefore very useful to calculate the economic impact of a university. This model will be completed by some parts of the Florax model (1987) which classifies different regional effects of a university and goes further than only the economic effects. Another model that will be used is the triangle model from Russo et al (2007). This is due to the fact that it is only possible to optimally benefit economically when there is a good relationship between the higher education (university), the community of the city/region and the private sector. The model of Russo et al. describes this in detail and in this thesis some basic aspects will be used.

Sudmant (2009) makes a difference between two kinds of economic effects that occur by the presence of a university. Often known is that a local university, like many other public institutions, can be an important source of local expenditures and local employment, both directly through local hiring and spending, and indirectly from the multiplier effects of the spending and re-spending. These economic impacts can be quantified by collecting the appropriate statistics and using relatively straightforward methods. The results make a very convincing case for the importance of the local university in the economic sustainability of a region. Less well known and more difficult to measure are the impacts and purposes from university research which goes a long way beyond a simple regional economic model: universities produce and transmit knowledge. The Vermeulen model (1996) incorporates both these impacts and is therefore well suited to determine the overall impact of a university. The Vermeulen model method is certainly not a completely unique way of analyzing the economic impact of a university. There are a lot of similar ways in which the economic impact of a university can be described. All these different kind of ways to describe the economic impact do not differ that much from each other and in essence they are often more or less the same. Of course there are always some differences in some details or in aspects of describing this economic impact.

The Vermeulen model

As said before the model from Vermeulen (1996) will be used to map what the economic meaning of the University of Zaragoza for the city is. The model investigates the functions of school (teaching), laboratory (research) and enterprise (business). Also the model describes the spatial scale of the effects and therefore these functions are categorized in input effects (effects that take place inside the region), output effects (effects that take place outside the region) and attraction effects (location and image linkages). The quantified functions of the university in the model of Vermeulen as described by Pellenbarg (2005) are: employment effects, purchasing power, R&D effects, qualification effects, warehousing effects, and location factor effects and welfare/externalities effects.

The model of economic functions of institutes of higher education and their spatial scope (Vermeulen 1996).

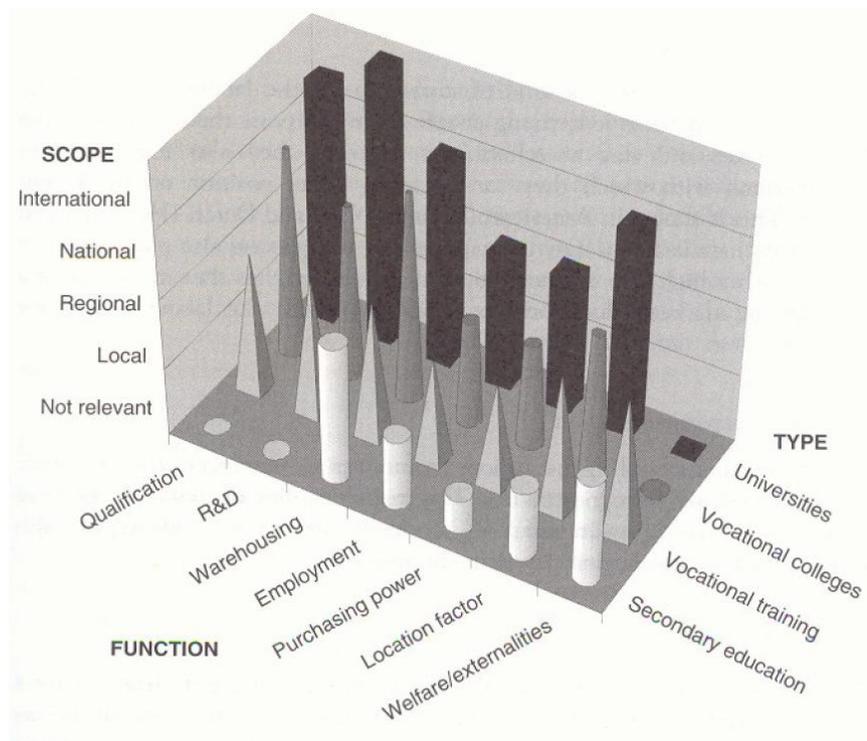


Figure 3: “The Vermeulen model”

Output effects

- *The qualification effects* are together with the R&D part of the ‘output effects’ and are supposed to rise far above regional level. The qualification effects are benefits for the city/region from the presence of higher education (university). The higher educated are supposed to earn more when they are graduated. For a city it is prosperous when they stay in the city to work after graduation because of their higher wages. According to Swinney (2011) the main direct impact of a university on its city economy is through the fact that the university attracts students from other regions or countries who otherwise wouldn’t come to the city but after graduation stay in the city to find a job. It is assumed that university schooled people earn a double modal income. They can spend more and that is advantageous for the city. However students often spread along the entire county after graduation and sometimes even further. For the model therefore it is the case to find out how many graduates stay in the city and find out the yearly extra input.

- *R&D effects* are about the (business) activity in the area of research and development, and what the inventions from university/research and innovations generate. These are contract activities. The biggest part of the money to do the research comes from the governments and the other part of the money comes from private firms. Hill (2006) states that through the impact of research universities distinguish themselves the most from other institutions. Hill (2006) further states that university research raises the productivity of industrial R&D because of the fact that the primary share of inventive activity is carried out in the industry where industrial scientists rely on basic science useful for specific problems. University research in that way has more impact than by directly generating new commercial products or technology through university research. The royalty incomes generated by licenses for technologies originated in university research laboratories can have significant impact on local development and can form a considerable portion of university budget (Varga 1997). However most economic impacts from university research will accrue outside the local area economy (Hill 2006).
- *Warehousing effects* are the effects that occur in the situation when adolescents choose schooling over the search for a job, if and when there are few jobs. 'Education performs a kind of 'storage function' with regards to the job market' (Pellenbarg 2005). These effects will be part of the qualification effects in this thesis and not be considered as a separate function as is the case in the original Vermeulen model. This because of the fact that this effect is already a variation on the qualification effects because it applies to a large extent the education of the working population and it is hard to map these effects very accurate.

Input effects

- *Employment effects* consist of the numbers of direct employment related to the university plus the indirect employment effect that occurs because of the spendings of the university to firms/business in the region. To measure the impact it has it is necessary to look at the height of the incomes and to make some assumptions about the spendings from these employees. By providing high-paying jobs for scientists and technical workers universities directly promote local economic development (Hill 2006).
- *The purchasing power effects* are the expenditures in shops, café's and spending on housing, sports and culture etc. by especially employees and students of the universities. Also part time jobs from students should be included. The multiplier effect is crucial for the calculation in this. Through this the jobs from the purchasing power effect can be calculated. The purchasing power effects and the employment effects are considered as input effects and are exemplary of regional effects. Varga (1997) states that these expenditures are direct impacts, which do not differ essentially from the similar effects of any large expenditure generating local institutions such as military bases or office complexes.

Attraction effects

- *Location factor effects* should be divided in two categories. On the one hand there are firms that started in or from the university and on the other hand there are firms attracted by the university as the main location factor. These effects are part of the 'attraction effects'. Location factor effects are about the attraction of businesses (and visitors) through the presence of the university. Often the presence of the university is

not the no. 1 location factor but is it one of the location factors. In that case the settlement of a company is not directly related to the university. Firms that wish to commercially develop major scientific advances need to establish close working relationships between their own scientists and the inventors and therefore it is likely that those firms are encouraged to locate in the region near the university (Hill, 2006). Within the businesses it is mainly about high-tech activity like research or science parks. In this the image of the university is very important. It should be taken into account that there is a difference between output and attraction effects even though it is sometimes difficult. Companies started as a spin-off of the university (founded by graduated or employees of the university) are part of the output effects. According to Varga (1997) these spin-offs are certainly a good indication of the impact of universities through innovation. Spin-offs are established to commercialize useful ideas developed by research at the university and they generate a lot of the economic growth in some high technology centers. However 'it is important to acknowledge that the impact of universities on city innovation goes beyond spin-offs' (Swinney 2011). When companies are attracted from elsewhere they are part of the attraction effects. The presence of a university in a city is one of the first location factors for companies. Universities guarantee a high educated labour force and they ensure the presence of other knowledge-intensive companies and institutions. Not only can the university strengthen the power of companies, they also reinforce each other. (Position Paper Kennissteden NL 2011).

- *Welfare effects/externalities* are positive effects that deal with the presence of a university. They have an impact on various social issues in a region and through an indirect way they also have an impact on the socio-economic development of the region where the university is located. These effects often support the image of the city/region. Often the presence of a university and students in a city ensures for a more positive image that people have of the city. These external effects are just as the location factor effects part of the attraction effects. Also in this the role of marketing can be important. Nevertheless the extent to which university cities make use of marketing differs in every case.

Additions to the Vermeulen model

The Vermeulen model is a complete model that reflects clearly the various aspects of university impact. Nevertheless in this thesis a number of applications will be made on this model. The Vermeulen model is mainly focused on the economic impact of a university and the socio-economic aspect in the model is only briefly discussed. Because of the importance of the socio-economic effects this thesis focuses a little more on some aspects of the Florax model. Furthermore, the context in which the economic (and social) effects (as described in the Vermeulen model) appear is interesting. This context is about different relations that are of interest and it is partly responsible for the extent to which the effects are present in the environment of the university. This context is clearly displayed in the triangle model, from which therefore the basic principles will be used in this thesis. In addition to this model also the importance and impact of governmental finance and the role citymarketing can play will be discussed.

The Florax model

The presence of the university has besides its economic impact also impact in other ways. It is important to notice that the already mentioned economic impacts of the University cannot be seen without considering all the other impacts. The Florax model (1987) gives an overview of all kinds of different regional effects that (may) occur because of the presence of a university. In the Florax model (1987) which is also used by Pellenburg (2005) to calculate the impact of the Groningen University, the economic impact is ('just') one of eight aspects from regional effects of a university. He divides the following effects; politic, demographic, economic, infrastructure, cultural, attraction, education and social aspects. These eight aspects cannot be seen separately from each other and are closely related. Even though the Vermeulen model certainly pays attention to the social externalities, in this thesis there will be extra attention for the social aspects of the Florax model which are the most related with the economic impact. These social effects will be added to the welfare/external function of the Vermeulen model which paid less attention to these (external) social effects. Because of the reason that the presence of a university has generally positive social effects which in their turn have a positive effect on the economic benefits of the region/city, these social effects will be taken into account when estimating the economic impact of a university. As well economic benefits are of positive influence on the social conditions in a city/region. So there exists an interdependent relationship between the economic and social benefits of the presence of a university in which they reinforce each other. Although the economic effects are likely to have a bigger influence on the social effect than vice versa.

<i>Regional effect of a university on:</i>	<i>Example</i>
Politics	Change in political structure, increased citizen participation, improved organisation of the political process
Demography	Change in the birthrate and deathrate, greater mobility
Economy	Effect on regional income, the industrial structure, the labour market, labour mobility
Infrastructure	Effect on housing, traffic, medical services, the retail sector
Culture	Greater supply of cultural goods, influence on the cultural climate
Attraction	Influence on the image of the region, the regional identity
Education	Effect on participation, change in quality
Social aspects	Effect on the quality of life, the influence of students

Figure 4. (The original) Florax 1987 model

The following aspects of the Florax model will be considered in this thesis and added to the welfare/externalities function of the Vermeulen model: Effects of quality of life, the positive social and lively influence of students, the boost on the cultural life, the increase of cultural goods and all kinds of effects on the infrastructure of the city. These effects are closely related to the economic effects and it is possible to get a good picture of the presence of these effects. The effects of the presence of a university on politics, demography and education are difficult to measure and are also less directly related with the economic effects. The effects on the image of a region and on the regional identity will be discussed in chapter 5.5 which deals with the marketing question. So the presence of a university has a positive impact on the social aspects of the city and/or region where it is located, however to which extent depends also on the relationship between the university, the community and the private sector.

The quality of life in a city is mainly positively influenced by the impacts of a university as described in the Vermeulen model. The impact of a university on the social aspects of life in a city is mainly caused by the student population and will also reinforce itself. Students from other cities will consider a (more) vibrant city earlier as an option to move to for their study and students from the city itself will be more likely to stay instead of going to study in another city. More students will also lead to a more vibrant city and so we can speak of a self-reinforcing effect. Russo et al. (2007) describe this by saying that “students are eager consumers of cultural and recreational products and, in many cases, are producers themselves”. They continue by saying that “cities with a large student population sustain a leisure infrastructure that could normally be found only in cities of higher rank, improving the quality of life of the resident population”. Students keep cities lively and diverse and are the citizens and high-skilled working class of tomorrow.

A vibrant city will have more attractive power to make inhabitants spend money in for example restaurants, bars, theatre and cinemas. Also inhabitants will spend their free time/holidays more likely in their own city instead of going to other places because there are enough leisure opportunities like cultural and entertainment events in their own city so the need to leave to other places is less. The presence of a university can make a significant cultural contribution to the local community. Open access concerts, public lectures, shared activities with schools and shared sport facilities with community are some examples of possible cultural contributions that a university can have for the local community. This leads to more public engagement and to cultural benefits from the universities by allowing public access to university cultural facilities. These contributions vary widely per university.

Important for the university and the city in attracting the high educated are the qualities that cities and regions offer and so determine the attractiveness for these group of people. This will include the variation of attractive living environments, the distinctive cultural and culinary offerings, catering and entertainment. Also important in this is the supply and quality of affordable and suitable housing for everybody related to the university. There should be a good supply of rooms for (foreign) students, apartments for young scientists and starter homes for graduates and to a lesser extent different types of houses for employees of the university. The presence of a university makes it for the city more urgent to invest in housing projects and ensure the quality of houses as well. In cooperation with the university sometimes campus(es) where students can live in large numbers are realized. With a large student population there also is always a dynamic housing market and a constant demand for rooms/housing.

'The triangle model'

The economic impact of a university cannot be seen without seeing the context. Russo et al. (2007) have developed a model which describes three relationships in a city which explain when a city can fully benefit from the presence of a university. This model of Russo et al. describes a triangle relationship between the three main fields in a city. This *sustainable relationship model* can be used once the several economic and social impacts of a university as described in the Vermeulen model are clear. To which extent they are influencing the city, the relations between higher education (university), the community and the private sector are crucial. "The chances of (economic and social) success are enhanced when a balance is sustained in the relationships between these three key agents of the knowledge economy". This thesis will not go into details of this model and in this thesis the model will only be used as a framework and only the essence/main parts of this model will be taken into account. This means that the focus is on the interrelations as described below.

- *Relationship between Higher Education and the Private Sector.*

This relationship is about the extent to which university-business relations are developed and in particular about how university expertise is transferred into industrial practice/needs. Also important in this relationship is the way how higher education institutions are embedded within the dense network of formal and informal links with local firms, to which extent the private sector contribute to research programs and how R&D and knowledge transfer facilities (like science parks) are developed. Common forms of cooperation in research and development between industry and academia are for example industry sponsored contract research, long term university-industry research agreements, and industry financed university research centres (Varga 1997). When there is suboptimal synchronization between universities and firms, the business community may be expected to develop less connections with the place. In an increasingly footloose economy, this is a great risk for cities that are seeing their economic base getting thinner as a result of strategic relocations.

- *Relationship between Higher Education and Local Communities.*

This is about a successful town-gown relation. To which extent are higher education institutions integrated in the city physically as well as culturally. Is the student community perceived as part of the local society and to which extent are student settlements a source of friction for the local residents in congested housing markets. Also it is the question if the city takes advantage of their vibrant atmosphere and if they have an open attitude toward students and foreign researchers. To improve the relation between university and local community, cities should invest in urban infrastructure, facilities for students and opportunities for exchange between students and host community. Together with strategies to keep graduates from moving away after their studies because of the (limited size of the) local labour market and/or because of the suboptimal housing supply this can help cities to take full advantage of the student population.

- *Relationship between Private Sector and the Local Community.*

This is about the extent to which firms contribute to the development of local welfare and to which extent the local firms maintain an inward orientation. This is likely to depend on the role that higher education institutions play as engines of urban development. They have the ability to drive the job market toward a more desirable structure.

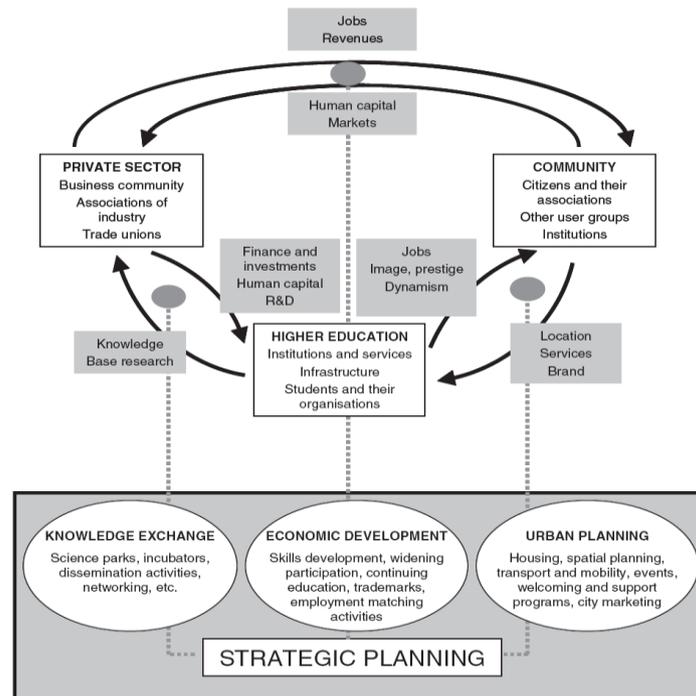


Figure 5. *Toward a Sustainable Relationship between City and University* (Russo et al. 2007)

Each group has specific interests in the development of higher education as an urban function and the strategic power to react to perceived imbalances in the processes of exchange that bind higher education to the local. So good relations are crucial to profit optimal from the economic and social impacts of the presence of a university. In that the city must develop a common vision of the city as an attractive, welcoming host of higher education and research functions, which are today just as important as pillars of economic development as for example manufacturing and technological excellence have been in the past.

Governmental finance

In estimating the economic impact of a university on its region it is important to take into account the financing that the university directly gains from the government. The financing can make the difference to which extent the region benefits from the presence of the university and therefore is an important aspect in the overall view of the economic impact of a university. Also this has an effect on the relation between university and the city. When a university gets a lot of financial support it is likely to have more opportunities to enlarge its role in local society instead of being an isolated institution. To which extent universities are supported financially by their regional government is different everywhere. Nowadays public universities feel the pressure as regional authorities are cutting finances for universities as a result of the financial crisis. However it's clear that the higher the financing for a university is the more impact a university can have in its region, it's not said that the universities which gain the highest funding compared to others also always have the highest regional impact. Varga (1997) states that local governments should consider their universities as potential factors in economic development. Therefore they have to weigh their investments in higher education institutions against possible future economic gains for the region. Sudmant (2009) states that 'the existence of a local university is actually a magnet for revenue to the province, much like an exporter. Unlike other worthwhile public expenditures, the university actually spends a great deal more in the local economy than what is provided by the provincial government'. Because of the fact that 'governments always seek fiscal policies with high

‘multiplier effects’ on the rest of the economy’ it is important to estimate the multiplier effect of university spending. ‘Government spending on universities normally induces more private spending as students and private sector companies also contribute greatly to the income alongside the government support’. Alongside this fact and maybe even more important is the dynamic effect of entire economies becoming more productive caused by the dissemination of knowledge. The extent to which the role of the university is recognized by policy makers as a primary driver of prosperity and that the spending on knowledge creation and dissemination is recognized as something different from any other form of government spending is crucial in the extent of financial funding (Sudmant 2009).

City marketing and the university

The presence of a university and students in a city generally leads to positive effects which are described in this thesis as externalities or welfare effects. These effects often support the image of the city/region as well as that they give the university a positive image. Citymarketing can emphasize them and so reinforce the image of the city. Within a globalizing world a city’s image is becoming more and more important. Individual cities have to profile themselves as attractive and they have to show how special they are and convince their ‘customers’ that they have something to offer. Therefore more and more cities make use of the tool called city marketing. In that view the welfare effects that occur because of the presence of a university are very valuable and it would be sensible that a city tries to benefit as much as possible from these effects. Despite its increasing importance it’s not totally clear for everybody what citymarketing really is. Hospers (2009) describes citymarketing as the long term process and/or policy comprising several interrelated activities aimed at attracting and retaining specific target groups for a particular city. Without giving too much attention to citymarketing, there are some aspects within citymarketing which require a brief explanation.

Citymarketing is usually compared with the marketing of normal products and the perspective that city marketing can be seen as an expansion of the marketing domain is often used. In that thought cities are just another subject for applying marketing tools. Hospers (2009) disagrees with that. He states that a city is far more complicated than a product because everyone experiences a city on its own way and moreover cities are historical units that are never finished. It is clear is that a growing number of cities show an interest in adopting a marketing policy. The reason for this according to Braun (2008) is that there is nowadays a more intraregional competition and also competition among urban regions. Cities have become competitors of each other in attracting and retaining target groups. Therefore cities have to make a lot of effort to attract people of these groups. In that it’s very important that cities make choices and specialize in certain areas. They have to concentrate on their strengths and the corresponding target groups. These target groups which are generally scaled as residents, visitors or companies must be convinced to choose for, or stay in a city. Within those groups there may also exist subgroups based on characteristics such as for example age of residents or type of economic activities of companies. With city marketing this process can be influenced. However citymarketing is more than only promotion. Identifying and satisfying the needs and wants of the target markets is the basis of marketing. The differences in characteristics, needs and wants between and among the target groups makes the importance of city marketing in that way clear, because of the fact that citymarketing aims at achieving a better match between the demand from the city’s customers and the supply that cities offer. Once that foundation is laid, the next challenge is to satisfy these demands more efficiently than competitors and therefore citymarketing offers cities a set of tools. These tools can give substance to the targeted approach for particular customer groups. Especially the tools that are meant to have an effect on the image of cities have become particularly important nowadays.

With citymarketing cities choose almost always for a specific identity and they enlarge or emphasize one or more certain characteristics which can help them in achieving certain objectives. This is called city branding. With city branding cities try to put themselves down in the market as a distinctive brand (www.gototalbranding.nl). Once a city has chosen for a specific identity/brand or when it has set up several goals, the city can put itself in the picture in different ways and so change or influence the perception of people about their city. The perceived attractiveness of the relevant city is very important in the decision making process of the (potential) city's customers and their spatial behaviour. Examples of city branding strategies are marketing campaigns, bids for cultural or sporting events, the development of signature buildings and different types of promotion actions. Often these elements are supported by a multimedia campaign in which a slogan plays a major role. Examples of these slogans are for example 'I love New York', 'I Amsterdam', 'There's nothing above Groningen'. So citymarketing is about campaigns, events and other marketing actions but to be successful it is also about concrete actions like for example investing in landmarks, company locations and student houses. Cities should have something to offer for their target groups and therefore they should deliver what they say (Hospers 2009). At last it is important to notice that city marketing management is part of urban governance and that it can not function without the support of various public and private stakeholders (Braun 2008). Because of the fact that there's a lot of money involved in citymarketing, the local governance should therefore monitor the acceptance, implementation and evaluation of the process.

The university can play an active role in the citymarketing in different ways. One option can be to position the city as a 'student city' and let the city embrace that identity. In here the city can choose for some corresponding values as for example young, curious, enterprising, etc. This identity of a student city can be achieved and strengthened through citymarketing and a number of related campaigns and/or marketing actions. The choice for a student city identity can be advantageous because student cities generally have a positive image and people often consider student cities as vibrant and associate them with knowledge. In this way target groups can be attracted to choose for the city. Besides the presence of one or more universities or high schools, it is necessary that a city has several characteristics of a student city and also has a history of a student city when embracing the student city identity. One target group which is becoming more and more interesting for cities is the student community. This group is logically already mentioned and is obviously the most important target group when a city embraces a student city identity, but also when a city lacks the characteristics of a real student city they can be attracted. To attract them it's import to aim at a 'student friendly city' profile. This can be obtained when there is for example a (prestigious) university, a good quality of living, (relative) low living costs, good employment opportunities and a vibrant culture (Otchere 2012). Besides the student city qualification the presence of the university can also contribute in other qualifications that a city gives itself to attract different kinds of target groups like (international) students, young residents, companies and high educated people. When a city lacks the true qualities of a student or knowledge city but there is or are university(s) or other forms of higher education this can always be used to give the city for example a younger appearance. Also the university can help in citymarketing with their knowledge and status in a more indirect way and be an added value when a city is for example organizing an event or is involved in (progressive) projects from which a city its image can benefit.

3. The Groningen University

3.1 Introduction

There have been many studies calculating the impact of different universities all over the world. As said before in this thesis there is no doubt about the importance of universities in today's world. Every university plays a role in some kind of way in its surrounding region but in which way and to which extent differs in every case. Also it is hard to compare universities with each other because of the fact that there are so many conditions which you have to take into account. To say that one university is more important for its surrounding than another one is only partly possible because of the fact that not all impacts are measurable. There will be always subjective aspects in the studies about universities but nevertheless it is quite interesting to give a closer look at the influence these big institutions have. This chapter will mainly on the basis of a report conducted by Galema et al. (2008) give a look at the University of Groningen. The city of Groningen located in the North of the Netherlands is considered a real student city and there have been different studies in the past about the importance of this university for its city and surrounding region. Here we will give an overview of this importance according to past studies as an example for the impact and the meaning a university can have.

3.2 The importance of a university for its region; The Groningen example

With around 190.000 inhabitants Groningen is the main city in a regional city network with 450.000 inhabitants (www.statline.cbs.nl). The city of Groningen can be identified in many ways but first of all it's a student city (Galema et al. 2008). Groningen has around 28.000 students currently enrolled at the University of Groningen (www.rug.nl). Around 22.000 students are studying at an other institution of higher education in Groningen and that makes a total of 50.000 students in Groningen. Of the nearly 50.000 students currently enrolled at the institutes of higher education, an estimated 35.000 to 40.000 lives in the city. As a consequence, one out of five inhabitants is student, which is quite exceptional for European middle-sized university towns (Snijders et al. 2009). It comes as no surprise that Groningen promotes itself as 'the city of talent'. That the university is so deeply rooted in the city has among other things to do with its history. Groningen is already a student city for centuries. Groningen University was founded in 1614 and is after the University of Leiden the oldest still existing university in the Netherlands. The Hanze University of Applied Sciences dates from 1798 and is the oldest multi sectoral high school in the Netherlands (Erkelens 2009).

To provide an overview of the importance of the University of Groningen we will look to some characteristics of the city and which place the university has in the local society. Further we look at the economic impacts in its region. According to Galema et al. (2007) the University of Groningen has strong local connections in the Northern Netherlands expressed by active involvement in the region. Also it acts as a university in a global field, conducting international research. Those strong local connections are crucial for the region to profit from the presence of a university. The university itself also acknowledges that. In its strategic plan 2010-2015 the University of Groningen (abbreviated RUG) emphasizes the strong anchoring of the university in the region and discusses the importance of the mutual relationships between the various players in the knowledge industry. In this the collaboration between the University of Groningen, the municipality of Groningen, the Hanze University of Applied Sciences and the University Medical Centre which is called 'the treaty of Groningen' is of great importance (Strategisch plan RUG 2010). Together they make agreements on the provision and positioning of the city of Groningen as a knowledge city and try to improve themselves as the 'City of talent'.

Topics in the ‘Treaty of Groningen’ are campus development, new businesses, internationalization, knowledge campaign/marketing, student housing and knowledge domains. Synthesis was found for co-operative investments in the following knowledge topics for the city and the university: Life Sciences, Nano Science, Energy, ICT, and Social Cohesion. Partners have invested 500 million Euros in 5–6 years in the realization of the agreed Treaty’ (Galema et al. 2007).

Groningen: (the image of) a student city

The city of Groningen ensures an ideal climate for the young population who determines the character of the city and has a tremendous impact on the city. Knowledge, talent and innovation are features of this population that fit in the city profile (Galema et al. 2007). In the city of Groningen there is enough space with good facilities, a nice living environment and enough cultural activities all within a lively city that is very compact. With around 190.000 inhabitants it is big enough to be attractive for businesses, universities and high schools but still compact enough to find each other. That all together is one of the main reasons that Groningen is known as a student city and that the university has such an (economic) impact in its city (Erkelens 2009). The main reason that Groningen has the image of a student city is probably because of the number of students that live in the city and so dominate the streetscape for a large part (Snijders et al. 2009). More than half of the population is younger than 35 years old (iscoms.org). Another reason that makes Groningen a student city is the physical presence of the university(buildings) throughout the whole city. The conclusion from Smit (2001) that the university life has a huge positive impact on the cultural life in Groningen shouldn’t be a surprise.

Groningen does everything to maintain its image as a student city. In their marketing they describe themselves as young, vital, dynamic etc. (Erkelens 2009). ‘90% of the people outside Groningen have a positive association to the image aspect ‘educational opportunities’ in Groningen’ (Galema et al. 2007). Figure 2 of Meester et al. (2006) shows that in people’s first reaction when thinking about Groningen the university is an often mentioned answer.

	2000	2002	2004	2005
City of Groningen	14%	15%	16%	20%
Martinitoren	13%	18%	15%	15%
Location	14%	13%	14%	13%
University	6%	7%	11%	11%
Companies/institutions	4%	9%	6%	7%
Landscape	8%	5%	7%	6%
Family/relatives	2%	4%	5%	3%
Agriculture	3%	1%	2%	2%
Something else	25%	23%	19%	15%
None	11%	7%	4%	8%
Total	550	550	550	550

Figure 6. First reactions with province Groningen. Source: Meester et al. (2006)

Many people see the university as one of the strongest points of the province Groningen as can be seen in figure the figure below.

Groningen	
University/students	11%
City/night life/shopping	19%
Language	0%
Water/lakes	1%
Dikes/Delta works	0%
Tourism/recreation	0%
Landscape	9%
Quietness/Space	12%
Agriculture	2%
Culture	4%
Mentality	4%
Something else	10%
Don't know	27%
600	

Figure 7. Strongest points province Groningen. Source: Meester et al. (2006)

These figures show the importance of the university in the image of Groningen and support the legality of Groningen to present themselves as a 'student city' According to Alsema (2012) the combination of the university in relation with the city is very positive in the appearance of the city of Groningen. 'The interaction between the city of Groningen and the university is nowhere else in The Netherlands that strong'. This image has always been really important according to Smit (2001). 'For the self-esteem, the status and the sense of counting the university contributes in many ways to the welfare of the region'.

The economic impact of the Groningen University

The university has an important role in the economy. According to Erkelens (2009) it is because of the fact that knowledge and innovation are the key drivers of the economy. With the University of Groningen, the University Medical Centre Groningen, the Hanze University of Applied Sciences, high quality ICT facilities, a strong creative industry and a growing number of innovative technology and life sciences companies, the city has a high knowledge density per square kilometre.

There are several reasons why the University of Groningen has a strong local impact and why it has such an economic importance. This is made clear by Galema et al (2007) through different economic statistics. They show that the University of Groningen has a clearly positive economic impact in the region which even seems to grow. They support this by several statistics in which this impact becomes visible. At first it is through the direct and indirect employment (created) at the University of Groningen. The university has a total number of 5,500 employees (www.rug.nl). The UMCG offers further employment to more than 10.000 people (Gemeente Groningen et al. 2009). Together they supply for a total number of more than 15.000 jobs which accounts for roughly ten percent of the jobs in the city of Groningen. Expenses in the region of the university and UMCG lead to an extra effect of 1000 jobs in the city and region. The purchasing power effects include spending of students of the university, employees of the university and the UMCG, employees of suppliers of the university and the hospital in shops, cafes, restaurants, on housing, sports, cultural events, institutions etc. there are about another 10.000 jobs created according to the statistics from Galema et al. (2007).

Further looking to the qualification effects, the annual output of graduates at the University of Groningen is about 3700. Of these graduates, about 35 % enter the regional labour market, i.e. the northern region of the Netherlands. They are expected to earn a double modal income, which is about 60,000 Euros instead of a modal income (30,000 Euros). These people pay higher taxes and have the possibility to spend more, which is likely they do in the region. According to Erkelens (2009) 50 percent of the population of the city of Groningen is educated at a college (HBO) or university and around 25 percent of the total number of jobs in the city of Groningen are knowledge related jobs. When looking to firms the University of Groningen has a significant role in attracting firms to the region. 5900 jobs are created by companies for whom the presence of the University of Groningen was the most important location factor to locate in Groningen. Through spin-offs about 1900 jobs are created. Subsequently these people are again responsible for extra spending in the region and so for about 2.250 extra jobs (Galema et al. 2007). When discussing the R&D function of the University of Groningen it can be said that in 2011 the turnover of contract based research accounted for around 118 million euro's, which is 21% of the total university budget of 564 million euro's (University of Groningen, 2011). At the end of the 1990's, 40% of the third money stream came from the government, 30% came from charitable institutions and only 10% came directly from companies commissioning research to the University of Groningen. Most of these companies are assumed not to be located in the northern region. Thus, the R&D effect is not exactly massively beneficial to business in the region, assuming that these rates have remained the same (Galema et al. 2007). According to the University of Groningen (2011) the number of patent applications doubled between 2007 and 2009 from 7 to 14 per year and received the university from the EU framework program more than 14 million euro's for projects.

The university makes an important contribution in the perception of people of Groningen. It comes as no surprise that Groningen does a lot to keep the image as a student city as already is mentioned. However it is difficult to express this in economic gains. In addition there are at last some characteristics that should be taken into account when looking at the impact of the University of Groningen. Firstly Groningen wouldn't be such a student city without the presence of the Hanze University of Applied Sciences. This institution reinforces the status from Groningen as a student city a lot. Together the University and the Hanze University of Applied Sciences have a positive effect on the region of Groningen and are therefore both responsible for the good position that Groningen have as a student city. Further the UMCG is an important part of the university its impacts in Groningen. Without this hospital the influence and impact of the university wouldn't be that big. Also it should be mentioned that the University of Groningen is not only a university of the city of Groningen but also a university of the region. 90% of the economic impacts occur within a radius from 30-40 km around the city. In this surrounding region in total, between 10 and 11% of all jobs thus are university related jobs (Galema et al. 2007). It has been shown that in economic terms the presence of the University of Groningen is of great importance in all its facets for the city and region of Groningen. But perhaps above all even more important than the economic significance or the importance as an educational and research institution is the contribution of the university to the welfare of the region. This intangible aspect in which the university for the image, self-esteem, status and the sense of counting was and is so important, should not be underestimated (Smit 2001).

4. Hypotheses

4.1 Introduction

From the information in the theoretical framework and the secondary literature from the Groningen University example, a number of hypotheses can be derived and formulated for the Zaragoza University case study. The hypotheses are related to the functions of the Zaragoza University and the (economic) impact the Zaragoza University has and they set some expectations out for the empirical research. The research questions and the hypotheses form the basis for the qualitative research of this thesis and they will eventually provide answers to these research questions in section 5.5, after the qualitative research which is primarily based on interviews has been done. The following hypotheses have been developed and cover (in the correct order) topics about; (1) the Vermeulen model, (2) the attraction effects and the Florax model, (3) the role of the university and its functions in the whole region, (4) the collaboration between the University of Zaragoza and the city of Zaragoza, (5) the marketing in Zaragoza and the place of the university in this and (6) the comparison between the University of Groningen and the University of Zaragoza.

4.2 Generating of hypotheses

1. The input effects (Employment effects, purchasing power effects) of the University of Zaragoza have a greater impact in the city of Zaragoza than the output effects (Qualification effects, R&D effects) and therefore are more significant for the city of Zaragoza.

The Vermeulen model recognizes three kind of effects; input-, output-, and attraction effects. Considering the input effects which are the effects that take place inside the region and the output effects which are the effects that take place outside the region, probably the input effects are relatively more significant for the city of Zaragoza than the output effects. This because of the fact that the input effects are usually more beneficial for the city and region where the university is located than the output effects according to the Vermeulen model. The expectation is that this is not different for the Zaragoza case partly due of the fact that probably a lot of graduated move to other cities as Barcelona, Madrid and abroad because of the lack of work in Zaragoza and unemployment figures in the whole of Spain. This affects the qualification effect of the University of Zaragoza. Also the share of the university graduated people is relatively small because of the large population of the city. Further it's expectable that the R&D activities relatively have a less remarkable impact in the city of Zaragoza because of the assumption of the Vermeulen model that the R&D effect is usually not exactly massively beneficial to business in the region. Also it is likely that companies and the government invest less in R&D activities because of the crisis and the expectation is that companies in Spain less realize what the university can mean for them.

With about 34.000 students and with 22 faculties it is likely that the input effects of the University of Zaragoza are relatively high. All the direct and indirect expenditures are likely to be made in especially the city of Zaragoza (and the rest in the region of Aragon). Since Zaragoza is situated very remote compared to other cities everything takes place in the city and there is little expenditure that flows out of the city. The same it is with (the multiplier effects from) the purchasing power effects.

2. The attraction effects (Location effects, welfare effects and externalities) of the University of Zaragoza will have little economic impact in the city of Zaragoza.

There is probably not much evidence that companies are located in Zaragoza only because of the presence of the University of Zaragoza. That the presence of the university has been one of the many location factors in the location decision of companies is more likely. Despite the fact that the University of Zaragoza is the only public higher education institution in the region, the companies that want to make use of the knowledge of the university normally already always have been located in the city of Zaragoza and so are not attracted by the University of Zaragoza. That is why it doesn't fall under the attraction effects as described in the Vermeulen model. When looking at the spin-off aspect of the location effects, there will probably be several companies in Zaragoza which started as a spin-off of the University of Zaragoza but these companies will contribute little in total number of extra jobs and other economic benefits partly because of the small size of these companies. Zaragoza is not known as a student city and therefore the social impact of the university in the city that may occur as described in the externalities/welfare effects part and the Florax model, is only limited also because of the large number of inhabitants in the city.

3. Because of the fact that the University of Zaragoza has a number of dependences at secondary locations in the region, the economic function for the whole region of Aragon is more significant than would be if the university was only located in the city of Zaragoza.

The University of Zaragoza is the only public higher education institution in Aragon that is related to the economic development and social welfare. It is plausible that the effects of the university functions as described in section 2.2 can be scaled for the whole region of Aragon and especially outside the city of Zaragoza inter alia because of the fact that the activities of the university spread along Aragon's three provinces, with inter alia research centres and teaching campuses located in Teruel and Huesca. These dependences should contribute to the fact that the university has an economic as well as a social and culture value outside the city of Zaragoza.

4. It's likely that the University of Zaragoza has an important role within several plans/strategies and developments in regional innovation policies.

Because universities have an important role in the contemporary knowledge economy and the fact that the University of Zaragoza is the only public one in the city/region it would come not as a surprise that the university is frequently used in the numerous innovative plans that are related to knowledge topics at which the city of Zaragoza has committed itself. We have seen this in the Groningen example and the expectation is that it is also the case in Zaragoza.

5. It's predictable that the University of Zaragoza is part of the city marketing of Zaragoza but its part is less significant than in the Groningen case.

The city of Groningen does everything to maintain its image as a student city and the student population is their most important target group. Their marketing is mainly focused on characteristics that are related to the student city image and they do everything possible to strengthen this image. It is likely that because of the fact that Zaragoza is much larger and

lacks the pure characteristics of a college town, this isn't the case in Zaragoza. Also Zaragoza should have several other properties/strengths where it can put its focus on in its marketing. However the expectation is that the presence of the university will be used in the marketing because of the value a university can have and the fact that the University of Zaragoza is together with the small private University of Zaragoza, the only university in the region and the importance of the university will not be underestimated. Zaragoza will not be seen as a student city but it is likely that in some ways the university will be used as a part of, or partner in some strategies in the marketing of Zaragoza and play one of the roles that it can play as has been discussed in the part about the city marketing and the university.

6. *The economic impact of the University of Zaragoza is relatively less significant compared to the economic impact of the University of Groningen.*

Even though the University of Zaragoza probably contributes significantly to the socio economic development of the city of Zaragoza and the Aragon region, there will be a difference with the Groningen case. Groningen is considered as a real college town and Zaragoza probably not. Further is the city of Zaragoza is much larger than Groningen. It is likely that inter alia because of these facts there is a difference in the extent to which Zaragoza and Groningen experience impact of the presence of their university and therefore the economic impact in Zaragoza is less important in relative terms. This will be investigated through measuring and scaling the strengths of all the effects in a table of both the University of Groningen as well as the University of Zaragoza and putting them next to each other, and so the universities can be compared clearly with each other.

5. The University of Zaragoza

5.1 introduction

The following chapter contains the information that is gathered in the interviews with various actors which are involved in the functioning of the University of Zaragoza each in their own way. In addition to these interviews which can be seen as the most important resources for this chapter also the results from a number of questionnaires answered by local companies and the findings from the ‘Socio economic contribution of the University of Zaragoza’ report will provide support.

The view on the university as well as the role of these actors in relation to the University of Zaragoza will be described. The model of Vermeulen will be the guideline in the second section and on the basis of that model the various economic functions of the University of Zaragoza and their spatial scope will be displayed. Also this section uses other theories that have been used in this thesis and it goes a little further into the social aspect by making use of some aspects of the Florax model. Also the importance of governance funding in the functioning of the university should be kept in mind in this section.

The third section will give a look at the quality of the three relationships among the key stakeholders based on the Triangle model. It is important to notice that both the Florax model as well as the Triangle model are complementary to the model of Vermeulen and are used to give a picture as complete as possible. So is tried to take all aspects into account that are important in the functioning of the university in the region. Section four discusses the role that city marketing plays in Zaragoza. It is interesting to see how this contemporary phenomenon involves the University of Zaragoza in their policy.

By testing this ‘stakeholder analysis’ against the theories and concepts as founded in the secondary literature, there is tried to present a complete picture of the total impact of the University of Zaragoza. In appendix 1 and 2 the concerned interviewed persons and the related interviews can be found. Section five will by means of the prescribed hypotheses link the information which is gained by the interviews to the theories and the prevailing perceptions from the secondary literature and than draw conclusions from this. In this way the research questions will be answered through the adoption or rejection of these hypotheses.

5. 2 The University of Zaragoza and the Vermeulen model

Qualification effects

It comes as no surprise that education is one of the main functions of Zaragoza University as well as in almost every Spanish university. With about 34.000 students the university is one of the biggest in Spain. (Universidad de Zaragoza 2009). Due to social changes and the current economic crisis it is interesting to know that the report of the University of Zaragoza (2011) states that the university does not stand still in its development in education field. The students are spread out over 22 faculties from which 13 are located in Zaragoza, 5 in Huesca, 3 in Teruel and 1 in La Almunia de Doña Godina. In the city of Zaragoza there are 4 big campuses. With around 3700 teachers the University of Zaragoza has a students/teachers staff ratio of 9.23 (Universidad de Zaragoza 2009). A main goal assessed by the University of Zaragoza of the teachers is to promote scientific and technical activities and to boost the educational and pedagogical renewal that is driven by the ‘Espacio Europeo de Educación Superior’ (European higher education area). Results of this can be seen through the quality indications of several PhD programs, the high number of research groups, the research groups that joined the CSIC (Spanish Scientific Research Council) and the university research institutes that exist at the University of Zaragoza (Universidad de Zaragoza 2011).

An important example of innovation in the education of the University of Zaragoza can be seen through the Campus Iberus project. This project of the University of Zaragoza has been recognized in the recent nomination by the ‘Ministry of education of the campus of excellence international 2010’. This project that the university presented together with the public universities of La Rioja, Navarra and Lledia has been rated as Campus International Excellence (CIE 2010). This aggregation of universities is backed up by the businesses and institutions dedicated to developing R&D activities with the four member universities. Mr. Jose Ramon Beltran (Vicerector Campus de Excelencia Internacional de la Universidad de Zaragoza) states that through this program the University of Zaragoza can differentiate its study program somewhat from other universities because of the fact that it specializes itself in the fields of materials and technology for quality of life, agrifood and nutrition, and humanities, heritage and identities. The university obtains money through this program and in this way the University of Zaragoza can offer a wider range of different skilled people and so contribute to a broader employability at the labor market.



Figure 8. The region of Aragon (source: unizar.es)

According to Mr. Fernando Beltran (Vice-rector for academic policy of the University of Zaragoza) the University of Zaragoza is highly regarded in Spain in a number of areas. Especially in veterinary, engineering and medicine the University of Zaragoza is having good results. Mr. Tomás Martínez-Ferrer (General director of Universities of the government of Aragon) states that these studies are highly recognized abroad. A proof of this is that a lot of medicine students move to work abroad after their graduation. One advantage of the graduated at Zaragoza University is that they often have a lot of practical experience at university level. This is also the case with engineers, of whom a large number moves to Germany to work. 'The level of graduated engineers at the University of Zaragoza is much higher than for example those in the United Kingdom because of their advantage in practical experience and therefore they are highly sought abroad' (Mr. Thomas Martinez-Ferrer). José Ocejo, secretary general of the CEZ (Confederation of Employers of Zaragoza) confirmed that the economic, engineering, medic and veterinary programs are the most powerful studies of the University of Zaragoza. 'For graduated in these studies there are often possibilities and they are usually wanted by companies in the economy of Zaragoza inter alia because of the good name the university has in these studies'. Even though the university is developing its education program it is important that the university adapts new rules for the current time. According to Mr. Thomas Martinez-Ferrer there are some careers/subjects that the university should change. 'Cultural studies, philosophy and literature are not necessary and are not important enough anymore'. There should be a better coordination between the programs at the University of Zaragoza and the demand that exists at the labour market. At the moment there are too much psychologists for the work that is available. The university should think more about the future and go in consultation with the students of the university to upgrade their education function.

The annual output of graduates at the university is about 4700 (Universidad de Zaragoza 2011). To map the positive effects of the graduates who enter the regional labor market it is interesting to see to which extent they actually find a job in Zaragoza or the Aragon region. About the chances for the graduated people at the university, Fernando Beltran is really pessimistic. He states that Zaragoza is not able to give them enough opportunities for a job in the city. Therefore a lot of high educated are moving to other cities and/or countries as mentioned before. This is due to the fact that the students of the University of Zaragoza have a good position in the market and are therefore wanted in other countries which is advantageous for the city of Zaragoza because when they weren't able to find a job the unemployment rate would otherwise be much higher. Although now they are working often in other countries the consequence is that therefore the impact (in for example tax rates) in Zaragoza of high educated is much lower than it could be. This is all because of the fact that the job market in Zaragoza is contracting.

According to Octavio Ratia (Director of Universa) the picture that is outlined by people like Fernando Beltran is far too negative. He states that only in a few studies a certain part of the graduates go work abroad but the majority of the graduates finds a job in the region. Graduates in engineering studies like computer and telecommunication engineering are a famous export product of the University of Zaragoza. However that is more a positive effect of the high quality education in this branch of studies than a result of lack of jobs in Zaragoza. On the contrary, many engineer graduates find a job especially in the city of Zaragoza. He further disclaims on some information which Universa has obtained after having done research into the accession of Zaragoza University graduates (in the year 2011) at the labour market. Of these graduates 82% found work in the region of Aragon (68% in the province of Zaragoza, 9% in the province of Huesca and 5% in the province of Teruel). The remaining

18% works logically elsewhere. These numbers endorse his opinion that there are enough possibilities for these young highly skilled workers just like he says that 80% of the graduates have found a job within eighteen months after their graduation. Another advantage for graduates according to Octavio Ratia is that the low threshold to the labour market in Zaragoza makes the entrance of graduates relatively easily (and faster). This is caused by the small size of the city (in terms of area) and the fact that there's only one public university. Although Zaragoza is a big sized city in population numbers the city is very compact and therefore it is easier to develop and maintain good relations. In his case he speaks about the good relation between the university and companies. The city and the companies in Zaragoza are relative small but the companies stay close in contact with the university and almost everybody in the business world of Zaragoza knows the university which ensures a faster entry of graduates into the labour market of Zaragoza. Obviously the role of Universa as a mediator between the university and employers is an added value in this according to Octavio Ratia.

Mr Thomas Martinez-Ferrer speaks about the importance of some qualities of the students at the University of Zaragoza and the advantages for, for example the chemical industry of the presence of the university. He explains that the University of Zaragoza is nationally in 2nd place in numbers of students in a chemical training. The university attracts a lot of students (from outside the region) which is very beneficial for companies in the chemical industry in Zaragoza because of the supply of high educated people. In total the University of Zaragoza attracts about 17% of their students from outside the Aragon region. In this the good name of the University of Zaragoza, in combination with the supply of some high-quality trainings will certainly contribute. A good example of a faculty that attracts students from outside the region is the veterinarian faculty. This faculty at the University of Zaragoza is one of only five veterinarian faculties in Spain and therefore attracts students from outside the region. These students will possibly make their entry on the regional labour market of Aragon after graduation which is very beneficial for the region.

To have an indication of the warehousing effects it is interesting to see that according to data given by Octavio Ratia, 6% of the graduates of the University of Zaragoza is still trying to increase their knowledge by learning and about 8,5% is working and studying eighteen months after their graduation. Therefore about 14,5% of the graduates postpones their (fulltime) entrance to the job market. It is difficult to say if the warehousing effects would have been lower if there were more high skilled job opportunities for the graduates. In general the graduates of the University of Zaragoza find a job soon after graduation so probably only a very small percentage is studying longer because of the fact that they aren't able to find a job. Since unemployment rates in Aragon are lower (and so job opportunities are higher) than the average in Spain it is likely that the warehousing effects of the University of Zaragoza are a little lower compared to other Spanish universities however it should be taken into account that these figures apply to the entire workforce. The university is further responsible for the fact that the human capital in Aragon is significant higher. Of the working population in Aragon the people have had 9.45 years of education on average. Without the university this would have been 8.51 years. These figures are in line with the general trend of universities (Universidad de Zaragoza 2011).

R & D effects

The research function is a broad concept, but the most important aspect of this function is the transfer of university knowledge and technology to (local) business and the collaboration with the knowledge economy. The University of Zaragoza describes itself as ‘the principal research centre in the Autonomous Community of Aragon’. They state that their research institutes, laboratories and research groups are interdisciplinary in nature, and claim that they have a developed infrastructure and technology. When describing its research function it is therefore in the first place interesting to look at the extent to which the university has found its place in the knowledge economy of Zaragoza (and Aragon). With around 200 research teams the university is involved in around 1650 research and contract projects according to the last information (University of Zaragoza 2009). The University of Zaragoza has seven research institutes in its structure of investigation and one more as associated institute. The goals of these centers are doing research in the basic fields of knowledge and its application to the civil society through the promotion of technology transfer between university and industry (www.universidad.es).

Last year (2011) the university had 739 contract activities with companies and they were over a total of 21 million worth according to Alvaro Hernandez (OTRI). These numbers even increase every year according to José Ramon Beltran. In terms of incomes the University of Zaragoza is therefore the 5th university in Spain and is only behind technical universities. In contract activities the University of Zaragoza is mainly focused regionally and nationally. Most of these companies are small local businesses but an exception is BSH (Bosch und Siemens Hausgeräte). This multinational company invests for more than 1 million a year in research and development and has several technical and research centers in Zaragoza. The total numbers of contracts could even be increased because of the fact that the University of Zaragoza has mainly short term contracts instead of long term research projects. With the ‘catedras’ the university tries to increase this. These catedras are an institutional and corporate instrument to maintain a (long-term) stable collaboration between the university and companies. Further the university develops about 15 new patents every year. In economic returns from inventions, the University of Zaragoza is the number two in Spain and the university is very active (Alvaro Hernandez). However the most inventions are sold to (international) companies outside the region which is bit disadvantageous for the regional economic impact.

A notable aspect related to the research on Zaragoza University are the so called ‘catedras’. The University of Zaragoza made a big effort to improve the relation with a number of (local) companies. Through the development of the ‘Catedras’ the research function of the university is used by companies and so the value of that function has increased for the society and it will benefit also the university itself. With the creation of these strategic and stable unions both parties can benefit from the results of research, developments and innovation which are supported by several activities. Training programs, conferences, forums and specialized courses are jointly organized and there is collaboration between a company and academic institution's research groups on projects of mutual interest and there are professional internships and grants available to its students, who are able to do their final year projects at a company. José Ramon Beltran states that these catedras are a successful tool to increase the long term relations with companies and to participate in research projects with companies for a longer time. At the moment the university is involved with companies in 51 Catedras. One of the companies that is involved in a catedra is BSH. BSH already collaborated for more than 25 years with the University of Zaragoza in research projects but since 2006 the company joined a catedra for visibility in the cooperation and to expand the collaboration. The

collaboration is focused on innovation in different types of research but also attaches the importance of social responsibility of the company, reveals José Mariano Moneva in the interview. BSH as well as the university benefits from the intensive collaboration and the region as well, directly through for example the spendings of the company in the region and the high paid jobs but also for the appearance of the region it is good that such a company acknowledges the importance of the university concludes the coordinator of the BSH catedra.

The University of Zaragoza devotes much attention to improve the research process and important in this is OTRI (Office of technology transfer). OTRI is an office within the university that ‘transfers technology’. According to Mr. Alvaro Hernández from OTRI, the office stands in between the researcher and the company and ensures a permanent contact with and between the university, companies and institutions. Companies can ask for (a) researcher(s) to solve a problem and OTRI helps in finding the right person and let the company keep in contact with that researcher. Then OTRI will be guiding in the creation of a project and they give an estimate that for a certain amount of money the company gets a certain result and they will become the owner of the technology. In the other way OTRI tries to sell the technologies founded by basic research of researchers from which they think it can be valuable for the market. In this case the university owns the technology and sells the patent. The other option is to introduce a product in the market is by creating a company. According to Alvaro Hernández the biggest advantage of the office is that researchers can directly work for and with the companies what can be a reason for better and faster results. OTRI tries to help this process.

Two examples that give a good image of the research activities of Zaragoza University are the Walqa project and the Zaragoza Logistics Center project. These two projects are quite different from each other but they can clearly reflect and symbolize the research function of the university that benefits its society. The Zaragoza Logistics Center (ZLC) is a research institute established by the Government of Aragon in partnership with the Massachusetts Institute of Technology and the University of Zaragoza. It is founded in 2003 and the ZLC campus is located in the heart of the largest logistics park (Plaza) in the southwest of Europe that serves as a working laboratory to transfer new knowledge and working practices. The ZLC research program brings leading faculty, graduate students, and research staff together with prominent global companies and organizations to engage in cutting edge research. The program serves as a model for closer cooperation between industry and academia in funding research and it turns the inventions of academic research rapidly into commercial benefits (www.zlc.edu.es). The Walqa Technology park is another example where the research of Zaragoza University is used. This unique business park, located 5km from Huesca is a center of innovation and R&D and is it specialized in knowledge economy technologies (like biotechnology, information technology and renewable energy). The University of Zaragoza is together with the University of San Jorge one of the two universities that works closely with Walqa and it has a laboratory at the park to support education and research of professors at the university. Also it tries to help in R&D activities which are carried out by companies at the Walqa park (www.aragonexterior.es). The laboratory of the university at the Walqa park is called the laboratorio juridico-empresarial and is an advanced laboratory for legal and business applications in the information society. Since 2003 it was involved in 4 European projects for which it received a total of 650.000 euro in grants, 8 regional and state projects for which it received a total of 500.000 in grants and 53 contract activities with companies and institutions. José Felix Muñoz researcher of ‘LabJE’ states that this type of laboratorium is quite unique and he says that their experiences have shown that the transfer of legal and technical knowledge to the companies at the park improves their productivity and

competitiveness. He further explains that in Huesca a number of traditional companies came down because of the financial crisis. The only place where some new companies in the surrounding area were founded was at the Walqa park. For these companies in the knowledge industry the role of the university was vital. However in these difficult economic times the financial support of the government is crucial in order to prevent that the efforts of the last 10 years become meaningless in 1 year.

Although the response to the conducted survey was a bit low, the answers gave a good indication of the importance of the university for local companies. On the question 'Is your company at this moment involved in research projects with the University of Zaragoza or did the company ever collaborate in research projects with the University of Zaragoza'? Six of the nine companies answered yes and explained that they collaborated in some kind of research project. Of these six companies only one company was modestly satisfied and five were nothing but positive. Two of them collaborated with the university in a catedra and stated that they achieved some very good results. One company was planning to collaborate in a catedra in the future with the university. What was often heard as the answer to the question of how their company benefits of the collaboration with the university, is that through university investigation the companies developed and increased the quality of their products which in some cases led or will lead to new research projects. Two companies mentioned that they collaborated in human resource projects. Further all the companies stated that they would work together with the university in the future which can be seen that the collaboration is an added value for the companies.

The three companies which are not involved at this moment in research projects with the university and/or didn't ever collaborate in research projects with the university and therefore answered no on this question, stated all three however that they have thought about working together with the university in the future. Also they thought that collaborating with the university in research projects would benefit their company and that there's a good possibility that their company is going to work with the university in the future. The reason of one of these three companies for not working together with the university was that they had subcontracts in the transfer of technology with the ITA, which is a technological institute in Aragon.

Other answers to the questions why the university is important for the region of Aragon are that the University of Zaragoza attracts many students from outside Zaragoza attracts and that it generates many services for the community of Zaragoza, the University of Zaragoza is a key institution for the development of the Aragonese population and is a opening to the outside. Also the survey made clear that besides the fact that the university offers a quick approach for research and development and that it ensures the supply of high skilled labour, the university further allows a quick access to and awareness among the latest business innovations.

Employment effects

The direct employment effect of the University of Zaragoza consists of the 5500 positions it offers. From these positions about 3700 employees work as a teacher and/or researcher. Almost 1900 people work at the University of Zaragoza in administrative and service related functions (Unizar.es). The university spends 186 million euro's per year to staff costs and this counts for 61% of the budget of the university. The university is not the largest employer in the region of Aragon: with about 7500 employees General motors Spain is the biggest employer in the region of Aragon. Also companies located in Aragon as Saica S.A and Sabeco for example are bigger in terms of number of employees. Through indirect employment the University of Zaragoza is however again responsible for many jobs. According to the report of the University of Zaragoza (2011) the indirect employment numbers are just as high as the direct employment effects of the University of Zaragoza. Through university expenses in the region another 5500 jobs are created in terms of employment. This production activity accounts for 304.2 million euro's in terms of output, and 187.5 million in terms of income in the Aragon region. This makes a total employment effect of the university of 11.000 jobs. About these employment figures and in particular the jobs, Javier Trivez (vice rector economics from the University of Zaragoza) says that without the university they would not have existed and according to him for this reason the university is the most important institution in the Aragonese region. To emphasize this, he further points to the fact that according to economic studies the university is responsible for 23% of the GDP of the Aragon region. In Aragon the average capital per person is about 30.000\$ and without the university this would have been about 25.000\$. Because the average capital per person in Spain is about 27.500\$, the income in Aragon lies 10% above the average in Spain. Javier Trivez claims that this underlines the importance of the University of Zaragoza in terms of employment effects. The sector in Aragon that benefits most of expenditures of the university is the educational sector followed by the trade and repair industry, the hospitality sector and the real estate and business sector (University of Zaragoza 2011).

Purchasing power effects

When measuring the purchasing power effects of the University of Zaragoza there are a few subgroups to take into account. Firstly the spending of students and employees lead to an extra 49.4 million income per year and about 1750 additional jobs in the region of Aragon (Universidad Zaragoza, 2011). This group is therefore by far the most substantial in the overall impact of the purchasing power effects. The most significant expense items of students are food, leisure, housing and transport. Further visitors (of for example students), employees of suppliers to the university and congress members are part of the purchasing power effects. The expenditures of the visitors and suppliers to the university are not remarkable for the University of Zaragoza and do likely not differ very much relatively from those of other universities in Spain thinks Javier Trivez, when his opinion is asked in an interview about these figures. About the last group which are defined as congress members he states that it wouldn't surprise him when that group has a bigger economic impact in the city of Zaragoza than in other cities. This because of the fact that Zaragoza presents itself as a city of congresses and aims to attract many conferences in the city of Zaragoza. In that way for example professors can exchange results of their research. However those differences in impact with other universities in Spain will not be large since it concerns a relative small group.

Compared with the spendings from students and employees, the impact of the other subgroups is relatively less significant in the Aragon region. According to the report of the University of

Zaragoza (2011) the expenditures of employees of suppliers, visitors and congress members account for respectively 300, 230 and 80 jobs which makes a total of about another 600 extra jobs in Aragon. In the city of Zaragoza these expenditures of especially students have a relative small local impact but in the cities of Huesca and Teruel where respectively 3000 and 1800 students study their expenditures have a relative bigger weight in the local economy states José Ramon Beltran who sees the expenses of students as one of the advantages which these cities have from the presence of the university dependences in Huesca en Teruel. When adding up the employment and purchasing power effects the university is in total responsible for about a number of 13.350 jobs. With an active population of 590.000 people this counts for 2.17% of the total employment in the region of Aragon.

Employment effect

Direct employment: 5500 jobs

Indirect by expenses of the university to companies in the region: 5500 jobs

Purchasing power effect

By expenses students and employees: 1750 jobs

By expenses employees of suppliers: 300 jobs

By visitors: 230 jobs

By congress members 80 jobs

Estimated a total number of 13.350 jobs when looking to the employment and purchasing power effect (University of Zaragoza, 2011).

Figure 9. Results of input effects in numbers of created jobs

Location factor effects

When looking to the location effects it is important to divide the two groups of companies which are associated with the presence of the University of Zaragoza. The first group consists of the companies which have established themselves in or are moved to Zaragoza and its surrounding area because of the presence of the university. The general opinion of the different actors with who has been spoken in an interview about the attractiveness of the university is that the presence of the university often is not the main reason for companies to establish themselves in Zaragoza or its environment. What often is indicated is that the university is one of the components in the overall picture that is important in the location decision of firms. The university does play a decisive role in keeping companies in the region. One of the persons that states that the presence of the university is not the only reason for companies to locate in Zaragoza or the surrounding region, is José Ramon Beltran. The reason that the presence of the university does prevent companies from leaving the region is that the existing relations between the university and several companies are so deeply rooted and the knowledge of the university is so focused on them that the choice to leave is less attractive for their company. Good examples are the big (and important for the region) companies called BSH (Bosch und Siemens Hausgeräte) and IQE (Industrias Químicas del Ebro) which have very strong and good relationships with departments of the research groups of the university.

In addition to the cooperation in research projects there is also another important aspect of the presence of the university for businesses. In the answering of an open question of the conducted survey about how companies benefit from the presence of the University of Zaragoza, 6 of the 9 companies indicated that they benefit from the University of Zaragoza

through the supply of high educated people that studied at the university. This shows the importance of the University of Zaragoza in the functioning of local companies for which (high) qualified labour is a need and supports the importance of the university in keeping companies in Zaragoza (and Aragon).

There are less examples of companies that indeed located in Zaragoza only because of the presence of the university however José Ramon Beltran mentions that there are at the moment some projects with companies which did come to Zaragoza because of the presence of the university because of developments in research groups of the university. These companies established here as a part of the parent company to work with the new techniques (patents) developed at the university. Alvaro Hernández from OTRI says that it indeed happens sometimes that a company is attracted by the presence of the University of Zaragoza. When it happens it is often about starting companies. He claims that there are at the moment a couple of starting companies that are going to locate in Zaragoza because of the presence of the university but this is not yet public information. José Ocejo says that a strong university helps in attracting new companies which are looking to develop in (another) city. The presence of the University of Zaragoza is in that case an additional advantage and sometimes an indispensable factor for the companies which choose for Zaragoza because of its strategic location in Spain. In the '80s big companies as General motors and BSH established in Zaragoza and the presence of the university was one of the reasons in their location decision. These companies work a lot together with the university and also José Ocejo says that this is one of the reasons that these companies are still located in Zaragoza. By continuing cooperating and with the supply of high educated people the University of Zaragoza can keep these and other companies from leaving to eastern Europe countries where the production is much cheaper. Mr José Mariano Moneva (BSH catedra) admits that the university is the keep factor and a key to maintain the BSH production and employment in the region instead of that the company is moving to for example eastern Europe. Due to the collaboration in projects as described in the R&D effects of this chapter, the quality of products can remain high and the tradition that the university has with innovation and their knowledge about the products keeps them attractive.

The second group consists of companies that have been emerged from the university itself. These are the so called spin-off companies. At the University of Zaragoza there have been developed 23 spin-offs since 2005 (Alvaro Hernández). The start up of these high-tech businesses (which are actually seen as part of the output effects and not of the attraction effects) gives a good picture in the way of how technology and knowledge is transferred to the market. Through the creation of these spin-offs also more than 130 qualified jobs in Aragon have been created. To promote this entrepreneurial culture of the university OTRI is founded. OTRI created in 1989, is a service of the University of Zaragoza and tries to promote, enhance, transfer and disseminate research results generated by the research groups of the University of Zaragoza and it supports (spin-off) companies and research groups in the development in R&D and innovation.

Compared to other Spanish universities the University of Zaragoza performs on average. Despite the fact that the creation of spin-offs doesn't lead to the biggest economic impact of a university as has been discussed before, Alvaro Hernandez thinks that in addition to the creation of jobs and any economic growth the spin-offs also strengthen the image of the university and the innovation culture of the region. Further there are some indirect benefits through the spendings of spin-off to other companies in the region however the customers from spin-offs regularly come more often from abroad tells Nicolás Cassinelli managing

director from 'nB nanoScale Biomagnetics', a technology based Spin-Off company from the University of Zaragoza. According to Nicolás Cassinelli 'nB nanoScale Biomagnetics' is maybe the most clear example of what a spin-off company should be. This company that develops instrumentation for the needs of magnetic hyperthermia research is derived from a hyperthermia research group and exploits their products commercially since 2008 when the company was created. Even though the university made a lot of effort to create this and other spin-off companies for transferring the knowledge to the society, the university doesn't have the legal tools to be legally part of the company because of the Spanish legislation and therefore the university has no shares in the company. Nicolás Cassinelli states that his spin-off still has a close relationship and collaboration with the original research group of the university. 'Without this collaboration it would be very hard to keep running a company like this'. Because of the fact that the Spin-off isn't part of the university anymore the university only benefits from the money that spin-off companies pay for the patent license. The main benefits for the society of Aragon through the creation of spin-offs are the taxes spin-off companies pay, the high paid jobs in the companies and the payment to other companies in the region. However Nicolás Cassinelli makes clear that his company 'cannot be compared with Apple' and the impacts are in the region of his and other companies are relatively small. Due to the fact that almost all spin-off companies are not profitable the first years and it is a hard time to start a spin-off in Spain, he thinks that the (beautiful) efforts that the University of Zaragoza makes are bigger than the total impact of spin-offs in the region.

Welfare effects/externalities

The external effects are to a large extent determined by the image of the region. Even though Zaragoza has a long history and tradition as a city with a university, the university doesn't dominate the image of Zaragoza states Juan Carlos Lozano (Director of cultural activities of the University of Zaragoza). The university is just one of the many attractiveness of Zaragoza acknowledges Javier De la Mano Jaquotot from 'Zaragoza Global'. However it does try to contribute the society of Zaragoza, a large part of the local population doesn't realize the social function that the university has. Mr. José Ramon Beltran claims that the University of Zaragoza has three important functions. Besides the already mentioned functions of educate and research he says that the university has an important social function. This kind of impact is the one at the University of Zaragoza that is changing more and more the last years and not without reason. The University of Zaragoza recognizes the importance of this function and the influence it has within the society and therefore it has set out three objectives. The first objective is about innovation and the relation with companies. The University of Zaragoza has since some years now a vice-president which is responsible for the transfer of knowledge and (technical) innovation to enterprises. Also the last 4 years the university made a big effort to get more stable relations with companies through the creation of the already mentioned 'catedras' as the second university in Spain. The second objective is to maximize knowledge disclosure to the society. By opening the university and using the media the University of Zaragoza tries to translate results of research to the population and show society the impact of the university. One way of translating the results to society happens by the use of a 'unit of scientific and/or cultural journalists' who make inter alia documentaries (from which already two won a prize). The third objective is to create a place where people can put their knowledge together. For this aim the 'Parainfo building' has been rebuilt. In this building there's an exposition place where most expositions of Zaragoza are held for free. This enlarges the awareness of the university by the people of Zaragoza. Further the university is trying to increase its social activities. The university has created a department with the name of 'the University of Experience'. This 'faculty for elderly' gives retired people the chance to

do some kind of a study with the intention to keep them in the middle of the society. 'Unofficial results show that these elderly people live healthier and their expectancy of life is higher. That the university is aware of its social and cultural function makes Dr. Juan Carlos Lozano (director of cultural activities of the University of Zaragoza) clear by saying that 'the University of Zaragoza wants to give something back to the society'. In addition to the presence of the students which are responsible for a wider range of social services and facilities in the centre of Zaragoza such as catering establishments, the university tries also in other ways to be clearly present in the centre of the town. The rebuilding of the Paraninfo building to a cultural and educational institution must should help to this aim. 'This is the most important instrument to get the university (back) in the city and to make the university more accessible for all the residents of Zaragoza' (Dr. Juan Carlos Lozano).

The Florax model

The Florax model pays attention to some social qualities of a university city which could strengthen the economic impact of a university. A vibrant city with a good quality of life can attract more students from abroad and the presence of a university sometimes even improves this quality of life is concluded earlier. In Zaragoza the quality of life is quite high states Lorena Calvo. Compared to other cities Zaragoza is comfortable, compact, more personal and the city has a good location with other interesting cities relatively close. It is a medium sized city with the advantages and not the disadvantages of a big city. To attract (international) students from abroad the city tries to profile themselves indeed as a city with a good quality of life. However in attracting students from outside the region, the city has much competition from big cities as Barcelona and Madrid which are more interesting for a lot of students and also have a good quality of life. Smaller cities that are known as student cities like Salamanca also have an advantage compared to Zaragoza because of the existence of a real vibrant student culture there. However the city of Zaragoza is attractive and vibrant enough to retain and attract the students from the region. Another important group that sees Zaragoza as an attractive city are foreign (Erasmus) students says Juan Carlos Lozano. For the city of Zaragoza it is therefore interesting to attract these students also because of the fact that they are the promoters of the city in the future. For Spanish students from outside the region of Aragon, Zaragoza is not particularly attractive and the characteristics which are responsible for the good quality of life in Zaragoza like safety, low congestion, relative low house prices etc. are also not really a reason for Spanish students from outside the region to choose for Zaragoza and so the good quality of life doesn't really benefit Zaragoza in attracting students. Javier de la Mano Jaquotot agrees that Zaragoza has a high quality of life but he believes that this has not much to do with the presence of the University of Zaragoza. He thinks that most residents of Zaragoza will say that the University of Zaragoza and the students are important for the city but that it doesn't directly strengthen the quality of (their) life the same despite the fact that the GDP figures given (earlier) by Javier Trivez suggest otherwise.

Another aspect of the Florax model is that students have a positive social and lively influence, boost the cultural life, increase cultural goods and have all kinds of effects on the infrastructure of the city. Felix Asin former manager of Ebropolis and now general director of social and sports at the city council states that Zaragoza has simply too many inhabitants to find these effects on a large scale. Of course some effects can be seen but it will be hard to draw strong conclusions when looking to some social impacts in the city caused by the presence of students. He says that students mainly blend into the crowd of the other residents of the city of Zaragoza. This is partly because of the fact that students live scattered throughout the city and that there are several campuses/faculties in Zaragoza spread out through the city. It is therefore clear that social influence of students of the University of

Zaragoza is the biggest in Huesca and Teruel. In these places the students make a more significant cultural and social contribution to the local community states José Ramon Beltran. José Ramon Beltran agrees with Felix Asin that the student community in Zaragoza is certainly socially important for the city and the presence of students can be seen good in the nights and through the fact that there is a dynamic housing market and always a demand for the renting of flats. The plans of the local government to develop an Erasmus housing district in a depressed part of the city mentioned by José Ramon Beltran are still in an early stage. The purpose of these plans is to improve the living facilities of that part of the city. If these plans take place this will be a clear example of how the city benefits socially and how it will have a boost on the infrastructure of the city through the presence of the students (and university).

Clear is that the University of Zaragoza does its best to organize cultural events for the residents of the city. With concerts, theatre performances and other free activities the University of Zaragoza tries to bring itself closer to the residents. The activities in the Paraninfo building organized by the university, function even better than the museums and other cultural attractions of the city claims Juan Carlos Lozano. However all this is becoming more difficult because of the fact that the University has to cut their expenditures and the government subsidizes for these activities are getting less. Also people from within the university have criticized the activities of the 'proyeccion cultural y social' because of the costs and they want to use the money for other purposes. Although research has shown that all these social and cultural activities are received well by residents and improves the image of the university among residents, still a big part of the population isn't aware of these activities. Through internet surveys the university is trying to get feedback about how to improve their position within the society of Zaragoza.

5.3 The University of Zaragoza and the triangle model

- *Relationship between Higher Education and the private sector*

The relationship between the University of Zaragoza and the companies can be seen in two ways. The first way is by looking at the degree to which the university and the local businesses collaborate in research projects and the extent to which they benefit from each other. This has been explained in the previous chapter so in this section it is interesting to focus mainly on the opinions of the various different stakeholders.

José Ocejo states that overall the relationship between the university and businesses in Aragon is good but in other cities like Bilbao and Barcelona the relationship is a little bit better because of the more direct character. Almost all companies realize what the advantages are of collaborating with the University of Zaragoza. Among the 35/40% of the industrial companies in Aragon that collaborate with the university are mainly the larger companies. The industry of Aragon is dominated by small companies and often these companies don't have the possibilities to collaborate with the university or don't want to collaborate because of the fact that they want to develop their products by themselves. Improving the relation between the (mainly small) companies and the university can be done by stimulating the companies more to collaborate with the university, show them good results of other companies and guide companies more in the whole process. Another aspect in the relationship that needs improvement is the fact that there are still professors at the University of Zaragoza which don't have an intention to collaborate with local companies because they prefer to improve their CV's. José Felix Munoz states also that many companies don't realize what the university can mean for them. He further claims that there exists a big distance between the university and companies. To improve this relationship it's important to show the positive results of other companies which they have achieved by collaborating with the university to other companies. When this happens on a larger scale more companies will be convinced of the value that it can have for them. This is the responsibility of the university but also the government can help in this.

The overall opinion is that last years the relationship between the university and companies is clearly improved. FEUZ and OTRI are good examples of organizations that have strengthened the relationship between the university and the local businesses states Fernando Beltran. These organizations are not unique but the knowledge that is made available for companies by for example OTRI strengthens the relations of the university with local companies. The economic impact and benefits of these good relations can subsequently be seen very clear in the money that is gained by the university and in the numbers of contracts with local companies. According to Javier Trivez the level of transfer of knowledge of the University of Zaragoza is a good indicator when investigating how well university-business relations are developed in Aragon. The University of Zaragoza is the 5th university in Spain in the attraction of funds for research and in the transfer of knowledge to companies it is above the mean in Spain. In explaining this success he points to the 'catedras' which are responsible for an improvement in the relation between the university and (mainly big) companies the last years. These 'catedras' are maybe the best example of how the university is embedded within the dense network of formal and informal links with local forms. In number of catedras the university of Zaragoza is the number two in Spain and this form of cooperation is a good example for the increase in knowledge transfer from the university to the society of Aragon and an increase in the bonding of companies with the region.

- *Relationship between Higher Education and Local Communities.*

Javier de la Mano Jaquotot states that the university is integrated very well in the city of Zaragoza. The government pays a lot of attention to the (transport) facilities and accommodations for the student community. Also the fact that the university has a long history in the city makes that it is one with the city. Juan Carlos Lozano claims that the students benefit the city mainly positive and the perceptions of local residents about the student community is that they keep the city vibrant with their presence. The only danger in not taking full advantage of the student population is that the local labour market is limited in size in some areas size and therefore some graduates have to move as we have discussed before.

- *Relationship between Private Sector and the Local Community.*

It is difficult to say to which extent firms in Aragon contribute to the development of local welfare and to which extent they maintain an inward orientation. In this thesis BSH is mentioned as a company that has really strong connections with their environment. For most small companies this is probably the same but for a multinational this is quite exceptional thinks José Mariano Moneva. The big companies normally do not have not such an inward orientation as BSH has and in Spain (multinational) companies usually don't collaborate that intensive with a local university. Again the catedras are a good tool to enlarge the bonding of companies with their environment.

5.4 The University of Zaragoza and citymarketing

This section tries to investigate the way the presence of the university is used in the marketing of the city of Zaragoza. In the part which is about the external effects is explained that the presence of the university and students in a city ensures for a more positive image that people have of the city and therefore it is the question to which extent the citymarketing of Zaragoza is focussed on attracting students because this differs in every case of university cities. This section will first pay attention to the citymarketing of Zaragoza as a whole. After that has been mapped the various aspects related to Zaragoza as a university city and how the university is used in the marketing will be discussed.

Even though there is a cooperation agreement between the university and the marketing actors of Zaragoza, the university plays only a marginal role in the promotion/marketing of Zaragoza. Javier de la Mano Jaquotot states that Zaragoza is too big to focus its marketing on the university and to promote itself as a student city. Therefore other things are more important for Zaragoza. The city of Zaragoza identifies and promotes it's self as an avant-garde city and as a city which focuses on sustainable development. It wants to show that it is not a usual city and that it turns into a better place to live thanks to the development of innovative (sustainable) initiatives. It further wants to demonstrate that it is a dynamic city where things happen and opportunities appear. It is a city for people, open to the world and it has a global spirit. The slogan 'Zaragoza a challenge a city' tries to strengthen this identity.

In general the city of Zaragoza has a really positive image and it wants to have the appearance of a medium sized city which has the advantages of a big city, but lacks the disadvantages. The city is known as a crossroad city and is seen as a comfortable city with a good quality of life. Therefore it aims mainly at retaining and attracting residents. When asking people outside Zaragoza what they know about Zaragoza, people speak about the Ebro river, the Expo hosted in 2008, the cathedral 'El Pilar' and the company General Motors. The university is normally not mentioned the says Thomas Martinez Ferrer.

In the economic point of view Zaragoza promotes itself a lot as a distribution centre in Spain and as a city of logistics because of its central location in Spain and the good infrastructure. Besides it focuses on attracting companies in the logistics industry it also tries to attract companies in the sustainable industry. The presence of the university can also contribute in other qualifications that a city gives itself. Besides the qualifications of Zaragoza as logistics city and city of sustainability there is a third asset which the marketing of Zaragoza uses in their promotion strategy. Zaragoza also tries to promote themselves as 'the city of ideas' and only in this image aspect of the city the university plays a role. This aspect of the marketing deals with knowledge and also with the university. The goal of promoting the city as a city where people can develop their ideas and projects, is to attract new companies and stimulate entrepreneurship in the environment of Zaragoza where they can for example do research on enhancing new technologies. The results of this strategy are difficult to measure because it started recently but it seems to be positive claims Javier de la Mano Jaquotot.

Even though Zaragoza is not really known for its university, the ZLC project is a good example of a university related activity that benefits the image of Zaragoza as a city of innovation, knowledge and creativity states Felix Asin. So in this the university contributes therefore indirect to a more positive image of Zaragoza. The presence of the university at the Walqa park and its role in the Campus Iberus project have a similar effect and also strengthen the image of Zaragoza as a 'city of ideas'.

5.5 Testing of hypotheses

This section will draw a conclusion from the results of the interviews that were held with the various actors and the survey that is conducted under a number of companies and are linked to the theories of the previous chapters. This will be done by testing the hypotheses that have been generated in chapter 4.

1. The input effects (Employment effects, purchasing power effects) of the University of Zaragoza have a greater impact in the city of Zaragoza than the output effects (Qualification effects, R&D effects) and therefore are more significant for the city of Zaragoza.

The investigation revealed that the input effects are indeed strong and that they have especially impact in the city of Zaragoza city where the university is located. Despite the fact that the university is not the largest employer in Aragon, the university offers a large number of direct jobs and the companies that benefit from the expenditures of the university are almost all local businesses. Since the largest part of this employment is by far beneficial to the city of Zaragoza, the purchasing power effects are also very strong in the city. After studying the data from the report of the University of Zaragoza it can be concluded that the number of jobs that are created by direct and indirect employment and purchasing power effects is about 13.350. Translated, this means that the university is responsible for in total 2.17% of the total employment in the region of Aragon. To this Javier Trivez adds that the University of Zaragoza probably has compared to other university cities a greater impact in its city where it is located because of the regional structure and the fact that these (and other) economic activities of the University of Zaragoza are very concentrated in Zaragoza.

The input effects thus have a major impact in the city of Zaragoza as the Vermeulen model predicted. Also the presence of the qualification effects and R & D effects of the University of Zaragoza can not be disputed. These effects are certainly very present only the question is whether they also occur within the city of Zaragoza. According to the Vermeulen model the benefits of these output effects occur mainly outside the region. For the qualification effects of the University of Zaragoza this is however limited since about 82% of graduates find a job in the region of Aragon and because of the fact that 75% of the industry in Aragon is in Zaragoza these qualification effects are even mainly related to the city of Zaragoza. Of a number of studies a certain part of the graduates moves to other cities or abroad (e.g. engineers) but the majority finds a job within the region which is not consistent with the expectations of the Vermeulen model and this hypothesis. In the report of the University of Zaragoza is concluded that revenues of taxes for the regional government are 420 million per year higher because of the university. This means that every euro that is invested in the university by the government returns in a gain of 2.6 euro's and this shows the local and regional influence of the qualification effects.

The university is further also responsible for a large number of local and regional R&D activities. It has a good relationship with the local business and is involved in various ways of the development of different kinds of local and regional R&D projects. The university is responsible for 20.5 % of the total number expenditures in R&D in Aragon. According to Javier Trivez the University of Zaragoza is therefore responsible for a much larger share of the total number of R&D activities than other universities in their region. It seems that the qualification and R&D effects of the university have a greater influence in the city and region than is assumed in the model of Vermeulen. The expectation that the input effects were high in Zaragoza was correct. But because of the fact that both the qualification as well as the

R&D effects are also very beneficial for the city of Zaragoza and not only take place outside the city as expected it can not be concluded that the input effects are more significant for the city of Zaragoza than the output effects. Therefore the hypothesis should be rejected.

2. The attraction effects (Location factor effects, welfare effects and externalities) of the University of Zaragoza will have little economic impact in the city of Zaragoza.

When investigating the attraction effects on local scale, research has shown that when discussing the location factor effects can only be observed to a small extent. With few exceptions there is not much evidence that companies have moved from other regions to locate in Zaragoza because of the fact that they were attracted by the university of Zaragoza as location factor no. 1. The most companies have been located in Zaragoza and come from outside the region often have chosen for Zaragoza mainly because of the strategic location of the city states José Ocejo. The presence of the university is in that often more indirect important as for example a source for the supply of labour. The university does play an important role in keeping companies in the city (and region) and is an added value for the local businesses the interviews and the survey have revealed. Because of the deeply rooted relations of local companies with the university in particular research and development programs and the supply of high educated, the university can be the decisive factor to stay in Zaragoza instead of moving away however this doesn't affect the influence of the location factor effects.

About the spin-off part of the location factor effects can be said that despite the fact that the University of Zaragoza is doing a lot of effort the last years to support spin-off activities and since 2005 there have been established 23 stable spin-offs in Zaragoza that were directly the result of the university these spin-off activities don't have a big local economic impact mainly because of their small size which correspondends to the theory. Further the impact of the spin-offs in Zaragoza will not increase the coming years because of the difficult financial times and the fact that the entrepreneurial spirit always have been less strong in Spain compared to other countries.

The welfare effects and externalities are also as expected only present to a limited extent in the city of Zaragoza. The university does its best to get closer to the people of Zaragoza as described but this has only a positive effect on a marginal scale because many people aren't very aware of the university (its activities). The student community is too small in relation to the entire urban population to be of big influence in the city even though most involved actors say that they do benefit the city in social aspect. The university further doesn't benefit the image of Zaragoza very much because not many people outside Aragon have (positive) associations with the university and the city because they know the city of Zaragoza mainly for other reasons.

It can be concluded that the attraction effects indeed have only a little local impact in the Zaragoza case and so are less important for the city of Zaragoza than the Vermeulen model in general assumes and thus the hypothesis can be accepted.

3. Because of the fact that the University of Zaragoza has a number of dependences at secondary locations in the region, the economic function for the whole region of Aragon is more significant than would be if the university was only located in the city of Zaragoza.

In this hypothesis the regional scale of the effects is particularly important. After having discussed the local impact of the university in the two previous hypotheses this hypothesis focuses especially on the regional economic function of the university. The university has definitely an economic and social impact in other places in Aragon besides the city of Zaragoza and the dependences in Huesca and Teruel are mainly responsible for that fact. The greatest impact there through the presence of the teaching campuses is because of the related number of students. However the exact numbers of economic impact there has not become clear in this thesis, several interviewed persons emphasize the importance socially but also economically. The student community is responsible for expenditures in these cities and with their presence they keep the cities vibrant is the general opinion of the interviewed involved actors. These impacts therefore can be scaled under the regional scale of the purchasing power- and welfare effects. Also the R&D effects can be scaled regionally. This is because of the fact that the university has several research centers spread along in the region. In this thesis mainly the presence of the university at the Walqa park is explicitly described and used as an example of the impact that the university has in the region. The decentralization of research centers outside Zaragoza is initiated by the government which supports these projects financially. This is due to the fact that it would be much more cost-effective to have these research institutes in Zaragoza close to the university itself and that is also what the different interviewed actors belonging to the university made clear. That the government stimulates this kind of university related activities to maintain it outside the city of Zaragoza shows that the regional government recognizes the value of the impact it has in the region.

The interviews have shown that the university is seen as the university of Zaragoza and not really as the university of Aragon. Almost all economic impact is also related to the city of Zaragoza as a result of the fact that most university activities find place there. The dependences are responsible for the fact that the university has also a vital impact outside Zaragoza. Although the university is only present to a limited extent outside Zaragoza, without the dependences other places would hardly feel any impact of the university. Therefore this hypothesis can be accepted.

4. It's likely that the University of Zaragoza has an important role within several plans/strategies and developments in regional innovation policies.

It turns out that it's difficult to test this hypothesis because it is hard to say when the university's role is important or not. Measuring the extent to which the university was involved in these innovation policies is based on the impression which is gained in interviews and so determines the conclusion of this hypothesis. There are several good examples where the university is involved in projects. The presence of the university at the Walqa park, the Zaragoza Logistics Centre at Plaza and its role in the Campus Iberus project are most often mentioned by the interviewed persons as progressive regional projects where the university had a prominent role in different leading regional innovation policies. According to Fernando Beltran the university tries at least to be involved in all regional projects and in his opinion it is therefore difficult to imagine regional policies without the university. Also in the international relations of the city of Zaragoza the university has a clear role Lorena Calvo revealed in the interview. This can be illustrated by the fact that the university even signed an

agreement to collaborate with the city in European projects that are subsidized by the European Union. Partly because of this the university and the city council regularly participate together in European projects and as a result both parties can both benefit from each other. The city council can put the university in contact with other universities of cities with whom they have partnership and/or agreements and for the city council the university is an added value because of their surplus of knowledge and because it strengthens the image of the city. Even though the interviews have made the impression that the university does everything from its part to play an important role in regional innovation policies, the comprehensive knowledge strategy 'Zaragoza towards the knowledge society' of 2003 however is the best example to show that sometimes the contribution of the university is not desired. In this strategy the university took no part until 2012 because the government felt that the university was too powerful and they were afraid of the dominance of the university states José Ramon Beltran.

So it seems that the university is indeed an important actor in various innovative plans and projects in the region. That the university is even sometimes seen as a threat indicates its size and power. It is however not possible to make a clear judgment as the information is not accurate enough for this. Therefore this hypothesis can not be accepted nor be rejected.

5. It's predictable that the University of Zaragoza is part of the city marketing of Zaragoza but its part is less significant than in the Groningen case.

It has become clear in this thesis that Zaragoza lacks the real characteristics of a real student city and that is according to most involved actors also the main reason that as expected, the citymarketing of Zaragoza doesn't really use the university in the image of Zaragoza that the city wants to create. In distinguishing themselves from other cities, the city uses therefore other aspects of the city in their citymarketing of which they think they are more useful.

This research has shown that students are very important for the city of Zaragoza and this is confirmed by all actors however mainly because of the competition of other Spanish cities students are not the top priority target group to attract for the city Zaragoza states Javier de la Mano Jaquotot. Also Zaragoza has despite the fact it is not a real student city, several qualities with which it can be an interesting city for students and foreign students from which is said that are representatives of the city and have some kind of an ambassador function. Zaragoza is a medium sized compact city, has good connections, transport and accommodations. With a university that has such a long history in the city and region, a big economic contribution, a good reputation and that is well integrated in the city it is surprising that there's no common strategy of the university and the local government to present the city as a city that acknowledges the value of (foreign) students.

So the university has indeed not a main role in the marketing but it is used in the 'city of ideas' qualification that the city has given it self. In this there's a small role for the university as an institution that is responsible for possibilities that Zaragoza offers to people who want to develop something. It should be mainly seen in combination with Zaragoza as a strategic location and crossroad city for companies. Compared to Groningen the share of the university in the citymarketing so is as expected indeed many times smaller. The city of Groningen does everything to maintain its image as a student city. Their marketing is completely focussed to strengthen the student city image and therefore the citymarketing is partly responsible for the fact that Groningen is known far beyond the region for the presence of their university. The

University of Zaragoza so has a role in the citymarketing of Zaragoza (however its share is maybe smaller) as expected and is indeed less significant than in the Groningen case. Therefore the hypothesis can be accepted.

6. *The economic impact of the University of Zaragoza is relatively less significant compared to the economic impact of the University of Groningen.*

When comparing the impact of the University of Groningen and the University of Zaragoza in this thesis the strengths of the different types of effects are measured and scaled as can be seen in figure 10 and 11. The economic impact of the qualification effect is quite similar. Both universities have a good reputation and in the level of annual output of students the universities do not differ much from each other. In Groningen the number of graduates that enters the regional labor market is smaller than in Aragon but because of the difference in size of the region the impact of higher taxes of the higher educated in the region is not that big. So in Groningen graduates tend to move faster to other cities in the country than they do in Zaragoza and therefore the effect for the University of Groningen can also be scaled nationally.

The R&D effects of both university have a significant impact in the region. Because of the bigger local industry it seems that the R&D effects of the University of Zaragoza just have a little stronger (local) impact than in the Groningen case. The University of Zaragoza is involved in many research projects and contract activities. It further has several research centres in the region which are vital for places like Huesca and Teruel. Also it has become clear that the transfer of knowledge to (especially) local companies has proven its importance for the region and the university has shown with inter alia the 'catedras' that it's progressive in terms of R&D. The University of Groningen is also involved in many different R&D activities but a lot of the companies with who they work are assumed not to be located in the northern region.

Both Groningen University as well as Zaragoza University is responsible for many direct and indirect employment. Where the University of Groningen is largest employer in the region and is responsible for about 10% of the jobs in the city of Groningen the University of Zaragoza is also important for the employment but it is not the biggest employer in the region. This and mainly the (much) bigger size of the city show inter alia that the employment effect of the University of Zaragoza is relatively seen by far not that important as it is for the University of Groningen. The same applies to the purchasing power effects which are present but are relatively seen also not that significant for the city of Zaragoza. Through the presence of the university dependences in mainly Huesca and Teruel the University of Zaragoza is responsible for both direct and indirect employment as well as for purchasing power effects in the region. Groningen University is only located in the city of Groningen but because of the fact that employers and suppliers to the university are living and/or are located in the region outside the city the effects can be also scaled regionally but so for some other reason.

Where the Groningen case has shown that the university has a significant role in attracting firms to the region, the research into the effects of the University of Zaragoza has not proven the same. The most companies in Zaragoza that benefit from the university have been there always in the past and most of the new companies see the university not as the main reason to locate in Zaragoza or the surrounding region despite the fact that they do see the university as an added value for their business. In spin-off numbers the University of Zaragoza is also not

having the same impressive numbers as the University of Groningen. According to the different involved actors the university is making big efforts to create spin-offs but a lack of an entrepreneurial culture in combination with the hard economic conditions are the main reasons that spin-offs of the University of Zaragoza don't have such an impact.

The welfare effects/externalities are very important in the Groningen case where the university benefits the image of the whole region and where the university has a massive positive social impact in especially the city of Groningen. The university of Zaragoza doesn't benefit the image of the city and/or region that people outside the region have about Zaragoza and/or Aragon. The university only does seem to benefit the image that the inhabitants of Zaragoza have of their own city even though they are often not completely aware of the economic impact it has. In Huesca and Teruel people have an even more positive association with the university mainly because of the positive social impact there.

To conclude it can be said that excluding the R&D effects all university effects as described in the Vermeulen model of the University of Groningen are relatively stronger or at least equal to the Zaragoza case and so the total economic impact of the University of Groningen is relatively more significant. Therefore the hypothesis can be accepted.

<i>The University of Groningen</i>	<i>Effect</i>	<i>Scale</i>
<i>Qualification</i>	+	Local/regional/national
<i>R & D</i>	+	Local/regional/national
<i>Employment</i>	++	Local/regional
<i>Purchasing power</i>	+/++	Local/(regional)
<i>Location factor</i>	+	Regional/national
<i>Welfare/externalities</i>	++	Local/regional/national

Figure 10.

<i>The University of Zaragoza</i>	<i>Effect</i>	<i>Scale</i>
<i>Qualification</i>	+	Local/regional
<i>R & D</i>	++	Local/regional/national
<i>Employment</i>	+/-	Local/(regional)
<i>Purchasing power</i>	+/-	Local/(regional)
<i>Location factor</i>	-	(Regional)
<i>Welfare/externalities</i>	+/-	(Local)/regional

Figure 11.

6. Conclusion

This chapter will provide an answer to the proposed research question designed at the beginning of this thesis. Furthermore implications will be shown and suggestions will be given for future research in this field, to conclude this chapter some attention is paid to the limitations of this study.

The main research question of this thesis was as follows:

What is the economic meaning of the University of Zaragoza for the city of Zaragoza and the region Aragon?

The findings in this research have shown that the University of Zaragoza is an important actor in the economic functioning of both the city of Zaragoza and as well the region of Aragon. The university not only guarantees many direct and indirect jobs by their daily activities it is also responsible for a significant increase in the average GDP per capita and therefore also for a substantial higher amount of tax incomes for the regional government. Maybe even more important is their contribution to the local industry which can be illustrated by the fact that the university is by far responsible for the largest share of the total number of R&D activities in the region. Thanks to the dissemination of their knowledge in various (innovative) ways and the close relationship with the local industry, the university can certainly be regarded as a regional booster, which was also in line with the expectations based on the Vermeulen model. However there are also some aspects of the economic effects of the University of Zaragoza that do differ from the assumptions made by the Vermeulen model. This can be seen in the rejection of the first hypothesis and the acceptance of the second hypothesis. Both the qualification as well as the R&D effects are also very beneficial to the local economy and not only take place outside the city in the Zaragoza case as the Vermeulen model expected. This because of the fact that graduates often find a job within the region and that the university is involved in several local and regional innovative (R&D) projects. With accepting the second hypothesis it has been made clear that the attraction effects in the Zaragoza case have less impact than is assumed by the Vermeulen model. That the University of Zaragoza is often seen as an additional value in the location decision of companies and that the university is an important keep factor for companies doesn't influence the location factor effects. Moreover the influence of spin-offs is small and the social contribution of the university is especially significant in Huesca and Teruel.

Furthermore in the functioning of the university also a number of other things stand out. The university of Zaragoza is not really seen as a university of the region because of the fact that most economic impact is related to the city of Zaragoza. However the university does have a vital impact in Huesca and Teruel because of the presence of university dependences. When the university would decide to return all university activities to the city of Zaragoza what would be cheaper for the university itself, the regional impact that it now has would almost disappear. In the image of the city and/or region the university contributes less than expected. The inhabitants of Zaragoza themselves underestimate the economic importance of the university and people from outside Aragon don't mention the university in the image they have about Zaragoza. This is partly due to the fact that the university is only used to a very small extent in the citymarketing of Zaragoza. That is than perhaps also the main difference in the comparison with the University of Groningen which dominates the image of the city and the where the citymarketing is mainly focussed to strengthen that image.

In economic terms both the University of Zaragoza as well as the University of Groningen is extremely valuable for their region however the relative economic impact of the University is less compared with the Groningen University. The regional impact of the Zaragoza university can be described a bit as consciously created while the regional effects of the Groningen university are more natural. This example shows that universities are able to guide certain processes. The difference between the University of Zaragoza and the University of Groningen can be seen further in the scale of the effects. In contrast with the Zaragoza case where most effects have their main impact on a local (and regional) scale, can in Groningen the effects be scaled sometimes on an even larger scale. Further the extent to which a city a city is called a 'university' does not seem to be determined by the economic impact the university has because of the fact that Zaragoza experiences a big economic impact by the university but nobody seems to consider Zaragoza as a 'university'.

To enlarge its economic impact in the city and region the University of Zaragoza faces difficult times. Where the financial support from the government is getting less and the costs go up, the university should have to work hard and be creative to maintain its prominent position in the society. This research have shown that its important that the university maintains its (guiding) role in regional projects and it keeps developing their regional activities. In this it should strive to improve its current relations and convince everybody of the value that the university can have. In all aspects it is therefore important to enlarge the awareness about the university how obvious that maybe might be seen.

6.1 Implications of the findings

This case study has an explorative character and therefore it would be incorrect to generalize the findings and apply on for example all Spanish universities, however providing some implications may be interesting. This research is mainly based on the assumptions that has been made by the Vermeulen model. That some outcomes of this research may differ from the expectations that were set on the basis of this model does not say that the Vermeulen model should be held under discussion. However the economic importance of the university as a keep factor of companies and the extent to which the university has economic impact when it is considered not as the main location factor but as a additional value, were concepts that showed up during this research and give opportunity to be further explored. Further it might be good to make some variations on the model based on some cultural differences between countries or cross-border regions. This because of the fact that this research for example showed that the Spanish system of autonomic regions affects the functioning of Spanish universities and the legislation of spin-offs in Spain is also different compared to other countries. Furthermore the role and the importance of governmental finance for universities in their functioning and the effect on their economic impact has not been discussed explicitly in literature and could therefore be further investigated.

In a more practical way, this research showed that universities that do not differ that much from one another in size can be very different in the way they have impact on the one hand, but can also have several similarities in their functioning on the other hand. Therefore this study shows some evidence and makes that it might be interesting to find out what the details are which make that universities are or are not (economically) important in some aspects. In the financial hard times where universities have to make choices in their spendings this thesis can be handfull in gaining insight in why universities make some decisions which sometimes don't seem to be the most logical at first sight. In the Zaragoza case a number of things would

be interesting for further research. The exact impact in the cities where secondary dependences of the university are located is not totally clear and also the meaning of university related activities like the presence on the Walqa park and the Plaza for the local business seems to be worth investigating more deeply.

6.2 Reflection on the research

As in most studies this thesis also has some limitations. Firstly because of the exploratory character 'hard' conclusions cannot be drawn. In this thesis is tried to map all the university-related functions and therefore it was not possible to investigate some aspects more deeply although that would have been interesting sometimes. Secondly in this research is tried to speak with several involved actors which had other interests and views on the functioning of the university. Due to the language barrier and the fact that some people weren't able to add something to the already aquired knowledge, some interviews have not delivered what was previously hoped causing that there can be attached little value to some interviews. Thirdly it was sometimes very hard or not possible to speak with some actors from certain sectors and this is illustrated by the low respons to the survey which was taken among local companies. Because of the very low respons rate there can be attributed less weight to this survey than previously was hoped unfortunately.

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Appendix 1. Interviews

Mr Felix Asin: Former manager of Ebropolis and now the general director of social affairs and sports of the local government. *Interviewed on 26-04-12.*

- Ebropolis founded in 1994 is an association for the strategic development of Zaragoza and its metropolitan area. In 1998 Ebropolis created the strategic plan of Zaragoza.

Mr. Fernando Beltran: Former vice-minister of science and technology in Aragon and now vice-rector for academic policy of the university of Zaragoza. *Interviewed on 21-05-12.*

Mr. Jose Ramon Beltran: Vicerector of ‘Campus de Excelencia Internacional’ of the University of Zaragoza. *Interviewed on 18-04-12.*

- Campus de Excelencia Internacional is a project that exceeds the known fragmentation of higher education and adds four universities and overcomes the geographical boundaries of four autonomous regions.

Mrs. Lorena Calvo: Officer of the International relations department of the Zaragoza city council. *Interviewed on 30-06-12.*

Mr. N. Cassinelli: Managing director of ‘nB nanoScale Biomagnetics’. *Interviewed on 06-06-12.*

- nB nanoScale Biomagnetics is a technology based company dedicated to the production of scientific and biomedical instruments, formed in 2008 as a spin-off company coming from the University of Zaragoza,

Mr. Alvaro Hernandez Business Creation Technician of the Spin-off Office, OTRI. *Interviewed on 25-05-12.*

- OTRI (Office of technology transfer) is a service of the university which goal is to stimulate the transfer of technology of the University of Zaragoza. It is among other things involved in the spin-off aspect of the university.

Mrs. Maria José Galvé Officer of the ‘Fundacion Empresa Universidad Zaragoza’. *Interviewed on 15-05-12.*

- FEUZ is a foundation founded in 1982 at initiative of the chamber of commerce and the University of Zaragoza to act as a center for information, advice and coordination between the university and companies.

Dr. Juan Carlos Lozano: Director of cultural activities of the University of Zaragoza. *Interviewed on 10-05-12.*

Mr. Javier de la Mano Jaquotot Head of projects of Zaragoza Global. *Interviewed on 13-04-12.*

- Zaragoza Global is corporation which objective is to build up the international image of the city of Zaragoza and to organize and run events related to the development, marketing and the promotion of Zaragoza within the new international framework.

Mr José Mariano Moneva Coordinator of the BSH catedra. *Interviewed on 02-06-12.*

- The BSH catedra is a collaboration between the University of Zaragoza and the company BSH Electrodomésticos España.

Mr. Thomas Martinez-Ferrer General director of Universities of the government of Aragon. *Interviewed on 08-06-12.*

Mr. José Felix Munoz Researcher at the Laboratorio Juridico – Empresarial (at the Walqa park). *Interviewed on 16-05-12.*

- ‘LabJE’ is a laboratory located at the Walqa park that provides support in teaching and research of university professors and collaborates with the companies on the Walqa park and others in R&D.

Dr. José Ocejo Secretary general of the CEZ (Confederación de Empresarios de Zaragoza). *Interviewed on 01-06-12.*

- The CEZ is an business organization in the province of Zaragoza. It Includes more than 100 organizations in all industries, hosting about 20,000 small medium and large businesses.

Mr. Octavio Ratia Director of Universa. *Interviewed on 23-05-12*

- Universa is a service of the university for the orientation on employment. The aim of this service is to promote the integration of young graduates in the labor market and adapt their qualities to the needs of companies and institutions.

Dr. Javier Trivez Vicerector economics at the University of Zaragoza. *Interviewed on 17-05-12.*

Appendix 2. General interview questions

About the Economy of Zaragoza

How big and important is the knowledge economy in Zaragoza and what is the role of the university in this?

How important is the University of Zaragoza in the economy of the city and the region?

To which extent is the university an economic booster for the economy of Zaragoza/Aragon and why?

To which extent does the economic crisis have impact on the functioning of the university and what are the challenges of the university for the future?

Which companies rely most heavily on science and university research for their technical advance?

About the different university effects

In which way can the impact of the university seen the best in the region and what characterizes the influence of the University of Zaragoza in its region (compared to other Spanish universities)?

What and in which way does the R&D of the university generate economic benefits for Zaragoza and/or Aragon?

How important is the university for companies (in their functioning) in Zaragoza?

To which extent do companies collaborate with the university?

What are other advantages through the presence of the university for (local) companies?

Do all companies take advantage from the presence of the university and do they realize what the university can mean for them?

How well do the 'catedras' function and which impact do they have?

What is the importance of the university in attracting or developing science parks and spin-off activities and how do they stimulate the economic situation of Zaragoza/Aragon?

To which extent have firms started in or from out the university?

To which extent and why are firms attracted by the university to locate in Zaragoza or its surrounding?

How important is it for companies in Aragon to locate close to the university?

How can the relations between the university and (big) (local) companies be described and how can they be improved?

How does the university supports the image of the region for companies?

How important is the presence of the university at the Walqa park and to which extent can it be seen as an example of the regional impact the university has? To which extent does this laboratory further contribute to the development of innovations and/or R&D activities in the region?

What is the local impact of university Spin-offs?

What can the university do to improve the impact of spin-offs?

How do the purchasing power effects benefit the city of Zaragoza and the Aragon region and where do they take place?

How are the opportunities for graduated in Zaragoza/Aragon and how well is the labour market matched with students/graduated of the university?

How fast do graduated get a job and how well are these jobs matched with their qualities?

Is there enough demand for high skilled labour in Zaragoza/Aragon?

In which ways is tried to let the graduates stay in Zaragoza?

To which extent do the graduated go to work in Zaragoza/Aragon? Where do they go to when they move out Aragon?

What is the influence of graduated in Zaragoza and/or region and do they make a difference?

What is the influence of university graduates in the (local)companies?

How big is the social and cultural impact in of the university the city/region?

Does the university in general strengthen/improve the liveliness of the city/region?

About the university in projects

How do the city and the university collaborate to optimize the knowledge of the university and strengthen the economy of Zaragoza/Aragon and what are the ways to improve this?

Is the university an optimal partner of the local government and private firms in the process of regional economic growth?

What kind of role does the university play in the relation between knowledge creation and the development of (local and regional) firms?

Which unique advantages are created in Zaragoza/Aragon thanks to innovation strategies/projects of the university?

Have some major regional projects changed the status of Zaragoza and did they also influence the importancy of the university? What was the role of the university in these projects?

To which extent does the university cooperates with the city government in projects and how supports the government the collaboration of the university with (local) companies?

Is the university and its student community well integrated in the city and is the city capable to offer employment and other challenging conditions to young graduates (like housing and other factors that determine quality of life)?

How important is the university used to gain European fundings for projects and is their a good collaboration between the university and the city in this?

About the Citymarketing

To which extent can Zaragoza be called a ‘student city’. Which characteristics are responsible for this?

Which aspect are important in the citymarketing of Zaragoza?

What are the important target groups for Zaragoza?

How is Zaragoza trying to be unique and attractive for different groups?

What is the role of the university in the citymarketing of Zaragoza?

Is there enough attention for the university in the citymarketing of Zaragoza?

Should Zaragoza try to attract more students or companies fromout the knowledge industry and which role can the university play in this?

To which extent is the university used as a part of the marketing/promotion of Zaragoza (to attract companies and or students for example) and to which extent do the city and the university work together to make the city attractive?

To which extent is the university important in the image that people of Zaragoza have outside and inside the region?

Does the university have some kind of an ambassador function for Zaragoza?

Appendix 3. Survey ‘Companies and the University of Zaragoza’

1 -How important do you think the university of Zaragoza is for the economic status of the region of Aragon and the city of Zaragoza? (please explain your answer further)

2 -How and in which way is the University of Zaragoza important for your company?

3 -Is your company on this moment involved in research projects with the university or did the company ever colaborated in research projects with the university?

Answer is Yes: What kind of research projects where this and did or does the coloboration with the university gained/gains positive results and to which extent did/does it benefits to the succes of the company? How likely is it that your company is gonna work together with the University of Zaragoza again in the future?

Answer is No: Has your company ever thought about working together with the university in the future? Do you think coloboration in research projects can benefits the company? Do you think that there’s a possibility your company is likely to work together with the univrsiy in the future? (please expain your answer further)

4 -Is your company working together with the university in any other kind of way besides research projects. (for example delivering products to the university)

Yes: In which way?

No: Why not?

5 -Does your company benefits in any kind of way from the presence of the University of Zaragoza?

Yes: In which way?

No: Why not?

Appendix 4. Companies and their answers

Company names:

- a. **Anonymous**
- b. **Transportes Urbanos de Zaragoza S.A.U**, a company that provides a service for urban transport.
- c. **Cerler global electronics**, a technology based company that is dedicated to design, develop and manufacture electronic products.
- d. **Implaser 99 S.L.L**, a company that manufactures safety signs and photoluminescent signage systems for all kinds of industries.
- e. **Emesa**, a company that implements solutions for the production of mechanical components for the elevator industry.
- f. **Ideconsa**, a company of civil engineering, construction and infrastructure.
- g. **Fersa bearings S.A**, a company that is dedicated to the manufacturing of bearings.
- h. **General Motors España S.L**, a car factory that produces Opel cars
- i. **Logisman Aragon S.L**, a company that is dedicated to support activities for land transport.

Answers of the companies:

1 -How important do you think the university of Zaragoza is for the economic status of the region of Aragon and the city of Zaragoza?

- a- Very important.
- b- The university promotes the growth and the development of the city.
- c- It is a knowledge benchmark.
- d- The high knowledge of the University thrives the local businesses.
- e- Positive for the knowledge in the environment and for the formation of professionals.
- f- It has a high importance because of the formation of professionals.
- g- It attracts many students from outside zaragoza and the generates many services for the community of zaragoza.
- h- The University of Zaragoza is a key institution for the development of the Aragonese population and it is a opening to the outside.
- i- The formation of professionals is evident, but we must also take into account that the R&D at the university is one of the main assets within the knowledge economy.

2 -How and in which way is the University of Zaragoza important for your company?

- a- Collaboration in R&D.
- b- It provides qualified labor.
- c- It provides qualified labor.
- d- It helps us in understanding the business world.
- e- It is not important for us because we (already) have technology transfer subcontracts with the ITA (technological institute Aragon).
- f- Very important, we work together actively.
- g- Because of the collaboration in human resourch projects.
- h- The University of Zaragoza is very important for our company especially because of the training of qualified professionals that join a company that demands professionals which are ready to face the growing challenges in a changing and competitive business environment.
- i- Direct through the formation of professionals and through the collaboration in the catedra that we have formed.

3 -Is your company on this moment involved in research projects with the university or did the company ever colaborated in research projects with the university?

a. Answer is Yes: What kind of research projects where this and did or does the colaboration with the university gained/gains positive results and to which extent did/does it benefits to the succes of the company? How likely is it that your company is gonna work together with the University of Zaragoza again in the future?

- a- X
- b- X
- c-Yes, Investigation, Quality products, Yes, Very likely.
- d-Yes, Human research development, 50% good 50% bad, Yes, Likely.
- e- X
- f- Yes, Water purification materials and contraction processes, Good, Yes, Very likely.
- g- Yes, Investigation, New projects, Yes, Very likely.
- h- Yes, Projects associated with quality, Information Technology and the environment, Satisfactory, Yes, Very likely.
- i- Yes, Investigation in the catedra, Work is in progress, Yes because of the fact that the work directly benefits our company, Very likely.

b. Answer is No: Has your company ever thought about working together with the university in the future? Do you think colaboration in research projects can benefits the company? Do you think that there's a possibility your company is likely to work together with the universiy in the future? (please explain your answer further)

- a- No, Yes, Yes, Yes.
- b- No, Yes, Yes, Yes.
- c- X
- d- X
- e- No, Yes, Yes, Yes.
- f- X
- g- X
- h- X
- i- X

4 -Is your company working together with the university in any other kind of way besides research projects. (for example delivering products to the university)

- a. Yes: In which way?
- b. No: Why not?

- a- Yes, in the services through the provision of equipment.
- b- We are planning to collaborate in the near future in a 'catedra'.
- c- No.
- d- No.
- e- No because of our collaboration with ITA.
- f- Yes because of our collaboration in a Catedra.
- g- Yes through the realization of prototypes and in the testing of equipment.
- h- No, at this time our collaborative projects have been completed and there are not yet created new projects.
- i- No.

5 -Does your company benefits in any kind of way from the presence of the University of Zaragoza?

- a. Yes: In which way?
- b. No: Why not?

- a- Yes through investigation.
- b- Yes the university allows a quick access and awareness among the latest business innovations.
- c- Yes.
- d- Yes the university offers a first quick approach for research and development.
- e- Yes because of the proximity of high educated labor.
- f- Yes because it helps in getting qualified personal/labor.
- g- Yes through the diversification of knowledge.
- h- Yes, as explained above the university provides high skilled professionals which can work in our company and also is the university responsible for a lot of stability in the region because if the fact that it is linked strongly to the region and it enables collaborative projects.
- i- Yes our company benefits from the university because of the collaboration in projects.