

Science & the city economy: an analysis of Magdeburg

Results of the EUniverCities peer review session, held in Magdeburg, 5-7 March 2013

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1. Introduction

There is an ongoing debate about the "third mission" of universities: their role besides research and education. Many universities are committed to "contribute to the society", but there is a wide variety of opinions and approaches regarding the "how" and "to what extent" questions. The pressure is mounting: due to the economic crisis, public expenditures are cut, and universities increasingly have to "justify" themselves by showing what their added value is for local or regional development. This report discusses how these challenges play out in the city of Magdeburg, Germany.

From the perspective of the city of Magdeburg (and also the State of Saxony Anhalt, of which it is the capital), a key issue is ***how and to what extent the universities and research institutes contribute to a structural improvement of the urban/regional economy***. The city, the region and the institutes (each with different priorities) face a number of challenges: connecting the university to SMEs, promoting entrepreneurship, attracting more students (in a context of an ageing region), and improving employment conditions for recent graduates and higher educated people in general, in a competitive (inter)national context. A crosscutting issue concerns the alignment of interests of the city, the region, and the universities/research institutes. How to frame the co-operation in an effective way?

In the context of the EUniverCities programme¹, Magdeburg hosted a peer review session. The session was intended to obtain views and inputs from "peers" from other cities, in order to learn from each other and help the stakeholders in Magdeburg to take next steps in the local support group. (see the full programme in annex 3). During the first day of the meeting, the "peers" were informed in more detail about the state-of-the-art and current policies in Magdeburg, and the challenges the city and its scientific institutes face. A number of local stakeholders presented their views to the audience. During the second day, the audience was split into three working groups, where each group contained a mix of foreign and local participants/stakeholders. The groups elaborated their observations and produced a series of recommendations and ideas for the city and its universities/research institutes.

This report contains the outcomes of the peer review session. First, it summarizes the basic features of the city (section 2), its economy, and the relevant policy context². Next, section 3 sketches the current technology transfer landscape in Magdeburg and the State, listing the most important organisations and initiatives in this field. Section 4 describes efforts of city& university to attract students and link science to the wider urban society. Section 5 concludes. Annex 1 contains more detailed results of the peer review: it includes observations, ideas and recommendations that were developed during the work sessions. The results are the fruits of a combined effort of all the people who were involved in the group discussions and the presentations. The author is highly indebted to all the participants in these groups, and in particular to the other workshop leaders, Mrs. Isabelle Pitre (City of Aachen), and Mr. Patrick van Geel (City of Delft), who both did an excellent job in moderating

¹ The EUniverCities project unites 10 European cities and their universities that want to learn from each other in this respect. The network addresses the issue how to frame co-operation between city and university, and arrive at smart, "next-generation" forms of city-university collaboration. The core idea behind the network is that more comprehensive types of collaboration and "co-creation" will bring significant benefits for both sides, and will strengthen the position of the city as knowledge-based city.

² This part is partly derived from the "baselines study" made for EUniverCities, for which the author interviewed a number of stakeholders in Magdeburg.

the discussions, and members of the Magdeburg team (Klaus Puchta and Janine Lehmann), who prepared the meeting so well.

2.Context

The City of Magdeburg has about 230,000 inhabitants. It is the capital of the State of Saxony-Anhalt. The city's historic city centre was heavily bombed during the Second World War and not rebuilt in the old style afterwards. So you find there a mixture of very different architecture. The population is relatively old (many of the young migrated after unification), but after years of population decline, in 2011 the city grew slightly in population. The student population of Magdeburg (about 18,000) plays an important role in animating the city and making it lively.

The cities' main economic sectors are mechanical and plant engineering, recycling industry and environmental technologies, healthcare, medical engineering, and logistics. Magdeburg is a significant production location (it is relatively cheap location in Germany), but most production firms are branch plants, that have R&D departments elsewhere in Germany. For example, a big windmill factory (4,500 jobs) moved from the northwest of Germany to Magdeburg, but mainly came for the region's manufacturing competence and productivity. The R&D and engineering departments are still at the company's headquarters. The regional economy offers relatively few jobs for the higher educated, which makes it difficult to keep students in the region after their graduation. The unemployment rate in the city is above the German average, but has significantly come down, from over 20% in the 1990s to 11.3% in 2013.

Magdeburg is located centrally in Germany, near an important motorway junction. There are (high-speed) rail connections to several destinations but unfortunately no connection to the high-speed railroad net. There are no major congestion problems: the area is relatively sparsely populated, and Magdeburg is the centre of a vast rural area. The nearest major airports are Berlin, Leipzig or Hannover (1.5 hour's drive).

Universities & research institutes

Magdeburg has a substantial knowledge base: 2 universities, and a number of research institutes. The Otto-von-Guericke-Universität Magdeburg (OVGU) is the main university in the city. It was founded in 1993 and is one of Germany's youngest. Its roots are in three institutes of higher education: the Technical University, the Pädagogische Hochschule, and the Medical School. It has 9 schools and around 13,500 students, and it offers 38 bachelor and 33 master's courses. There are about 500 foreign students. Most of them come from China, Eastern Europe and Vietnam. There are a growing number of foreign researchers, mainly in the top-level research fields. In the school of chemical engineering for example, over 50% of the researchers are from abroad. Research at the university covers a large array of topics and themes, but key research fields are neurosciences (in co-operation with the Leibniz institute), dynamic systems, and automotive research. The university has a budget of about €80m from the state, and earns another €50m from other sources.

The city also has a University of Applied Sciences, Hochschule (H²) Magdeburg-Stendal, established in 1991, with 4,560 students, and a technical orientation. Finally, there are a number of scientific institutes with links to the university: they are listed in table 1. Taken together, they employ about 850 people. Note that Magdeburg's scientific infrastructure is still relatively young: most institutes were founded in the early 1990s, after the German unification.

The State of Saxony Anhalt is a key actor determining matters at the universities of Magdeburg, as in Germany, university policy is the competence of the States. The State has an important say in the strategic orientation of the universities (recently, it decided to move

the schools of music and education science to Halle, the other main city in the state), and the State runs many relevant funding programmes and schemes to promote R&D and innovation in its territory (more on this in the next section). It spends substantial amounts of European funding, through the Operational Programme, in which R&D and innovation are priority areas.

Key data Otto von Guericke University	
Employees (Medical Faculty (MED) between brackets	
Professors	220 (60)
Scientific staff	1,540 (780)
Technical/administrative staff	1,940
Total staff:	3,700
Basic funding/annum:	€80m
Third party funding/annum (2011):	€50m

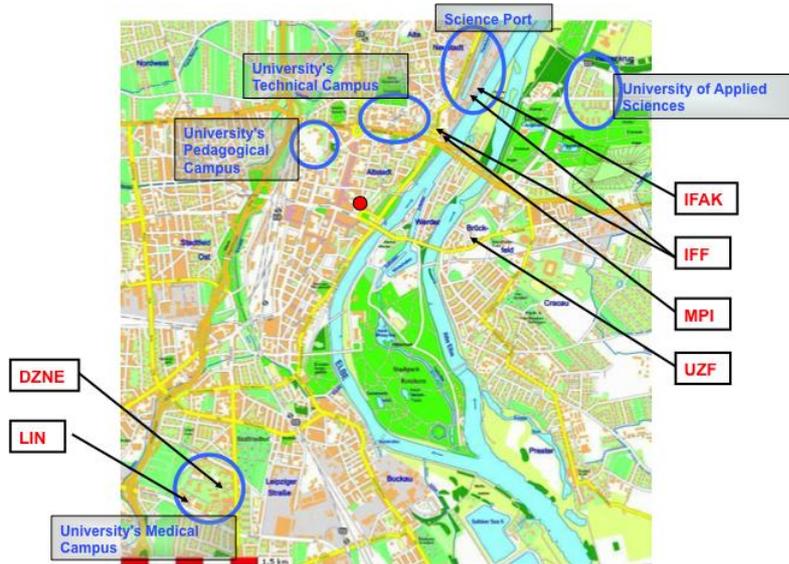
Table 1. Scientific institutes located in Magdeburg

Institute	Research fields	Key facts
Max Planck Institute for Dynamics of Complex Technical Systems	Analysis and synthesis, design and control of processes in chemical and bio-engineering	Founded 1996; 240 employees + guest scientists
Fraunhofer Institute for Factory Operation and Automation IFF	Innovative and client-driven solutions in the fields of logistics, automation, process and plant engineering, digital engineering	Founded 1991; 156 employees
Leibniz Institute for Neurobiology	Research institution for the mechanisms of learning and memory	Founded 1992 (based on a former GDR-Institute); 140 employees
Helmholtz Centre for Environmental Research (UFZ)	Aquatic Ecosystem Analysis, River Ecology, Lake Research	Founded 1991; 80 employees
Institute for Automation und Communication (IFAK)	Process control and automation technology, industrial communication, measurement and sensor technology, information management for automation, mechatronics, traffic transport telematics	Founded 1991; 60 employees
German Center for Neurodegenerative Diseases (DZNE)	System perspectives of degenerative dementia	Founded 2009; 80 employees

National policy is relevant as well. The national government organises all sorts of competitions between universities (or consortia) where they can win additional funding for specific activities or programmes. The most significant line is the federal excellence programme. Based on quality criteria, a very limited number of German universities obtained an “excellence” status, with significant funding attached. According to the university representatives we interviewed, the universities from the East of Germany stand no chance in this competition, given their small size and limited resources. On the positive side, in 2008, the German government set up the programme titled “University Pact”, a stimulation package

to keep student numbers of the Eastern part of the country at level (this is a challenge because of demographic decline in this part of Germany). Several contests were set up, where cities/universities could compete for funding.

Figure 1. The location of universities and scientific institutes

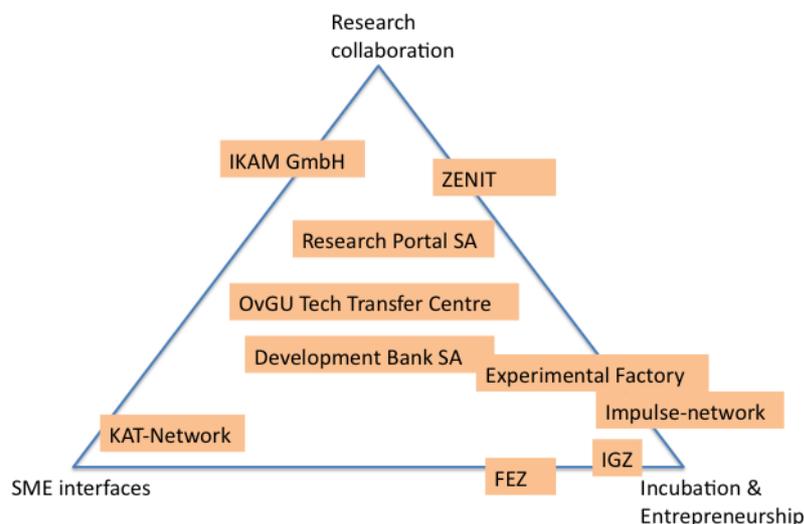


3. Research & business: interfaces

In GDR times, the link between university and the local/regional economy was very natural: Magdeburg was a main centre for machine building (45,000 jobs in 1989); the technical university educated engineers for this industry, and conducted research in this field. But after 1990, the industry collapsed (its markets in the East evaporated, and it was unable to compete in global markets). In 1995, only 3,000 jobs were left in this sector. Simultaneously, the university was urged to adapt to the West-German system, in which universities were conducting mainly theoretic and basic research rather than applied research for the industry. Over the last decade, science and higher education have gained a more prominent place on the city's agenda. Many actors have come to recognize science and higher education as important lifelines for the urban economy and society in Magdeburg.

However, the connection between science and the regional economy does not come easy. The economy of Magdeburg and its region is dominated by SMEs. 60% of the companies have a turnover of less than €2m (2009), and only a small number of firms (254) have permanent R&D activity³. This complicates the interaction between the universities and companies in the region: companies do not have the “absorptive capacity” to benefit from (or collaborate with) university research groups. Moreover, the labour market for highly qualified jobs is relatively small compared to other major German cities. Most students leave the city after education for regions with more well-paid jobs. Nevertheless, the universities are important carriers of the local and regional economy. They are important employers, and attract smart people (students & researchers), with positive impacts on the labour market and quality of life. In this section, we describe several “interfaces” that connect universities and the local/regional business sector.

Figure 2. Science/ research - business interfaces



³ Source: presentation of Prof. Dr. Raith, 5 march 2013, Magdeburg

Table 2. Organisations linking business and research

Organisation	Function	Ownership	Some key figures	Website
Experimental Factory (ZPVP GmbH)	Research and transfer center for application orientated research in product, production and process innovation	University and city	Founded 1996; 4,500 m ²	http://exfa.de/cms/front_content.php?idcat=2
R&D Centre Magdeburg (FEZ)	Centre for R&D companies; offering research infrastructures for SMEs	University of Applied Sciences, city	See annex 2	http://www.fez-magdeburg.de/
Centre for Neuroscience innovation and technology (ZENIT)	Technology transfer in neuroscience	University and city	Focal areas: Neuropharmacology, Neuromedical techniques, Applied neuro-computer- science Zenit I: 4,394m ² ; ZENIT II: 3,362m ²	http://www.zenit-magdeburg.de/en/home/concept.html
Institute for Competence in Automotive (IKAM GmbH)	R&D competences and infrastructures for the automotive industry; contract research, testing, concepting, prototyping, consultancy	Funded by national and regional government	Total public funding: €36.6m	http://www.ikam-md.de/de/
Innovation and founder centre (IGZ)	Incubator for technology companies	City of Magdeburg (30%), OvGU, Chamber of Commerce, Local Bank Magdeburg	Founded 1991; 75 companies, 450 employees, 25.000 m ²	http://www.igz-md.de/
OvGU Technology transfer centre	technology transfer, fairs and events, research funding and EU-academic network of Saxony-Anhalt, patents und licenses	University	See annex 2	http://www.ttz.uni-magdeburg.de
Development Bank SA	Funding of all sorts of R&D and innovation projects	State of Saxony Anhalt	See annex 2	http://www.ib-sachsen-anhalt.de/
KAT-network (competence for applied and transfer oriented research)	Network of universities in the State aimed to improve regional competitiveness; companies get access to university competences and infrastructures	State of Saxony Anhalt		http://www.kat-netzwerk.de/index.php?article_id=10

Figure 2 shows the most significant organisations that link research to the regional economy. They are put in a triangle with three dimensions: research collaboration, SME interfaces, and incubation/entrepreneurship. As the picture suggests, many organisations are active in two or more domains. Table 1 gives a brief description of each organisation.

Research collaboration

Research collaboration refers to projects/programmes in which university groups/research institutes collaborate with companies and/or other research institutes. In many cases, there are (incidental) collaboration projects: a single professor or research group that wins a research contract, participates in a larger consortium, or conducts contract research for a firm. In other cases, collaboration is more structural and programmed. Seven fields stand out in this respect: neurosciences, automotive, medical engineering, dynamic biosystems, digital engineering, fluidized beds, and renewable energy⁴. Collaboration is actively promoted and supported by the Technology Transfer Unit of OVGU, and by a number of other institutes and networks.

The economic impact of research collaboration is difficult to estimate, but probably it is substantial. Research collaborations bring in additional funding, part of which is used to attract (temporary) scientific staff (PhDs, postdocs). The OVGU alone attracted about €50m from external funds (2011). Some recent initiatives are also promising in this respect: the most remarkable one is the STIMULATE-programme (see box), that has the ambition to have 150 people working on it by 2022. Research collaboration can help to not only attract resources and new research staff, but also teams from technology companies that work with university groups.

The STIMULATE-programme

A remarkable recent partnership takes place in the field of *Medical Engineering*, a focal research area since 2009. About 34 chairs work together, from a variety of disciplines. A particular strength within this field is Image Guided Interventional Procedures, that combines knowledge from imaging, physics, biology and surgery. Magdeburg was one of 10 winners (out of 96 applications) of the “Research Campus” Initiative of the Federal Ministry of Research and Education, with the STIMULATE project (Solution Centre for Image Guided Local Therapies). For a 15 year period, university groups will collaborate with Siemens and eventually other partners, to develop technologies for image-guided minimal-invasive procedures; moreover, training programmes will be set up for professionals learning how to work with the new technologies), as well as academic courses. Federal funding amounts to €2m per year, plus funding from industrial partners. The ambition is to have 150 people working in R&D by 2022. Local SMEs and research institutes will also take part, and the programme is open to welcome new industrial partners. The programme puts Magdeburg on the map as centre of expertise in this particular field.

Entrepreneurship

City and university promote entrepreneurship in various ways There are several incubation and start-up centres in Magdeburg where start-ups are supported; The OVGU set up a chair of entrepreneurship to support students and researchers to become entrepreneurs, to integrate entrepreneurship in the curricula, and to conduct research in entrepreneurship. In

⁴ Source: presentation of Prof. Dr. Volkmar Leßmann (Vice President for Research, Technology, and Equal opportunities)

the “TeGSas-Project”, OVGU collaborates with the Universities for Applied Sciences Magdeburg/Stendal and Harz to promote the development of technology-based spin-offs.

Until recently, incubation and start-up activities were focused on technology fields, appealing mainly to (young) males. Recently, new targets are addressed specifically: women and elderly people, and students/researchers in social sciences. In the MovE **ii** project, efforts are made to increase female entrepreneurship. The project facilitates and supports female nascent entrepreneurs of all universities in Northern Saxony-Anhalt. Moreover, the university is integrating entrepreneurship into the curriculum of the social sciences and humanities, and seeks to link young entrepreneurs with seasoned ones through the SE-JU project (Senior-Juniorpreneurship).

Does Magdeburg’s science base stand out as creator of new business? So far, the number of spin-offs out of the science base is rather limited. Since 1996, it is estimated that about nine substantial high-tech companies were founded in the periphery of the OVGU (Ibid.). This figure is not exceptionally low compared to similar sized universities. The university ranked 10th in a recent entrepreneurship ranking of German universities. (<http://www.wigeo-muenchen.de>)

Funding opportunities

Science players in Magdeburg may tap from a large diversity of funding opportunities for technology transfer of different kind. On a federal level, there are several funding schemes, provided by the DFG (German Research Organisation) or federal ministries. A key regional player is the Development Bank of Saxony-Anhalt. It offers 20 grant schemes and 30 loan schemes to promote economic development, and many of them are related to tech transfer, valorisation and entrepreneurship. The funding is substantial: In 2011, the bank approved a total volume of €358m in grants, and € 339m in loans. Funding can be obtained for research and technology projects, knowledge and technology transfer and innovation assistance. More details are in Annex 2.

Buildings and areas

Magdeburg has a number of buildings and areas where science is to be “translated” into marketable products and services, or new companies. Around the universities, there are the Innovation and Founders Centre, the Experimental factory, the ZENIT (Neurosciences), the IKAM (Automotive), and the FEZ (innovation and research centre near the University of Applied Sciences). Most of the infrastructures are co-owned by the city. On top of that, the city is developing the Science Harbor, an old inland port area that is being reconverted into a dynamic location for scientific institutes, but also leisure and housing functions (the area is attractively located near the river Elbe, close to the city centre, and adjacent to the university campus). Already, some major research institutes (Fraunhofer, Max Planck) have settled there. One of the silos in the areas was reconverted in to a Think Factory (“Denkfabrik”). A key tenant is the IFAK institute, founded in 1991, by a professor who wanted to continue to conduct applied research (rather than turning to more basic research, as the authorities wanted). IFAK conducts pre-competitive research for industrial clients (mostly outside Magdeburg) and in all sorts of nationally and European sponsored research projects.

4. Beyond the research-business interface: human capital

The economic impact of the university (and adjacent research institutes) goes beyond the direct relations with the business sector. Most importantly, the institutes attract fresh students (about 18,000 in total; 8% of the cities' population) and employ researchers and other staff. They spend their incomes in the city, and contribute to the liveliness of the place in various ways. Also, the presence of high-skilled workers could make the region more attractive for knowledge-based companies. However, the region faces a lack of critical mass: most of the students leave after graduation, because there are few appropriate jobs available in the region, and career perspectives are poor compared to other parts of Germany. At the same time, knowledge-based companies (or establishments) are not queuing to relocate to Magdeburg or Saxony Anhalt: first of all, the propensity for such companies to move is low overall, and secondly, the size of the local skilled workforce is rather small. Most new private investments are production of logistics facilities, rather than R&D or innovation departments (from this perspective, it is even more important for Magdeburg to promote new business creation out of the science base. Some studies show that newly-founded companies are relatively likely to stay in the region and thus contribute to employment creation).

In Magdeburg, the city administration and the scientific institutes have come to recognize that the cities' future depends to a substantial degree on the strategic collaboration between the key players. The year 2006 marked acceleration in the collaboration. That year, the city applied to the nationwide contest to become "City of Science". A steering group was made, with a number of stakeholders (city departments, university, research institutes etc.), and they jointly developed the bid book. Although Magdeburg did not win in the end (Dresden was the winner), the event was the trigger for a sustained co-operative effort of city and the scientific stakeholders to develop Magdeburg as a city of science. A coordination office was created, uniting a number of partners including business associations, churches, sports clubs, and cultural institutions. Together, they developed a large number of activities (250 events in 2006) to link science to the city in a number of respects. In 2009, the Mayor established a "Team Science", directly under his supervision, consisting of two officers who arrange and organise all sorts of activities, projects and meetings related to the development of Magdeburg as a science city. On the senior decision-making levels, personal relations between city and university are good: The key decision makers know each other well, and the links are easily made in a medium-sized city like Magdeburg.

Currently, a number of regular co-operation structures are in place: first, there is a Strategy Group ("Major players round"), once a year, in which the Mayor meets with all the institute directors, and the rectors, to discuss strategic common issues. Topics on the table are questions related to housing, construction of new facilities and buildings, economic development (incubators, innovation), and joint events such as the Long Night of Science. A second platform is the Science Work Group, where press and PR officers of all the institutes meet and exchange news and latest developments on a bi-monthly basis. Third, there is a "Monitoring Committee" for the development of the Science Harbor, the urban redevelopment project in which an old inland port is transformed into a "science harbor".

In particular, decision makers in the city and the university realise the importance to remain attractive as student city. They have a joint interest to attract more students, from Germany and abroad. The universities face a declining "captive" regional market and need to attract students from elsewhere. For the city, attracting young people is equally important: young people contribute to the liveliness of the city, they bring resources, and may contribute to the

labour market or start a company. Their economic and cultural contribution⁵ is substantial. City and universities recognize their common interest and develop activities together.

Universities and city recently participated in contest “experience campus and city” (Campus und Stadt erleben, 2009/2010), a contest open for the east part of Germany. Magdeburg ended as one of the four winners.

Activities of the “experience campus & City programme:

- Creation of a virtual “travel agency far east”: discover studying in Magdeburg, to attract and inform (prospective) students and their friends from other regions in Germany (www.reisebuero-fernost.de). Travels could be booked to the campus days.
- Campus Days: Two days (Fridays and Saturdays) of open doors for prospective students, organised in close co-operation between university, university of applied sciences, and the city (city marketing unit, but also public transportation). Visitors can book a travel guide (a student guiding the way through city and university; accommodation). Meanwhile, the city organises amenities and facilities (concerts, cheap hotel rates, sponsoring).

One selling point for Magdeburg is student accommodation. There are no indications of shortages, and prices are low (about €200 for a large room, rather low from the German perspective).

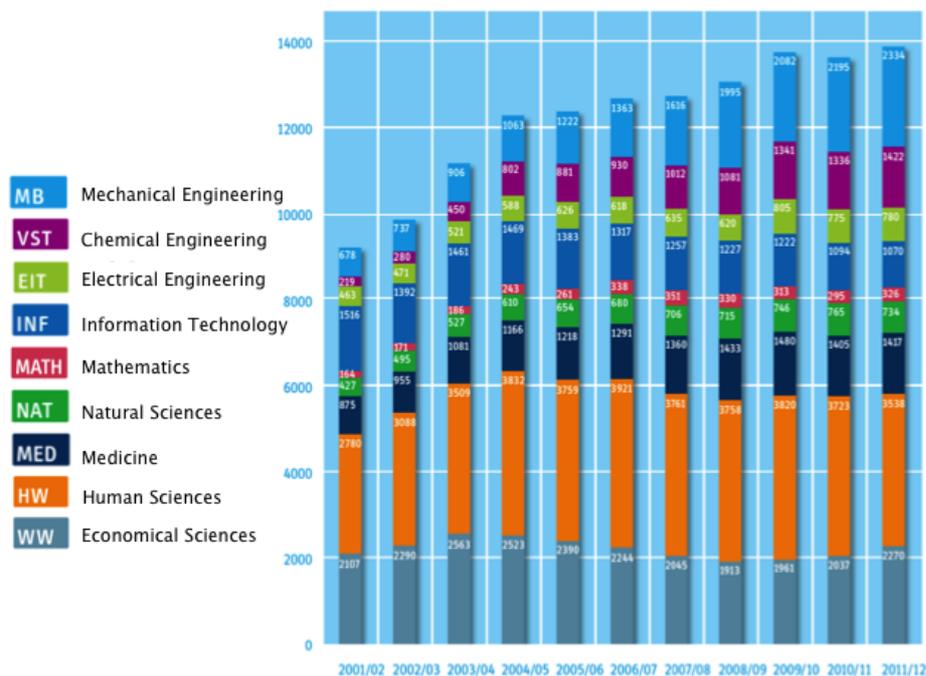
Foreign students are especially welcome in Magdeburg. The city has established a working group to make a strategic plan how to accommodate foreign students and knowledge workers in a better way, in many respects (issues discussed are housing, allowances, permits, procedures etc.). It is a collaboration of several city departments and the university. At the end of every study year, the mayor welcomes all the foreign graduates that obtained their diploma, as a sign of respect and commitment.

There are indications that the efforts to attract students are paying off. The total number of students has risen from 7,206 in 1999 to 13,891 in 2011. The fastest growth took place in technology studies. Over the last 4 years, the number has been relatively stable. The university used to attract students from the nearby region, but this has changed in the last years. In 2007, 70% of freshmen came from the state of Sachsen Anhalt, of which Magdeburg is the capital. By 2011, this percentage had dropped to less than 40%, indicating the attractiveness of the university beyond the state.

Finally, in Magdeburg, the city and its universities are very active to connect the scientific community to the city at large. The city has a remarkable science museum (built for the 1999 federal garden show), and develops all sorts of activities to link science to the wider society.

⁵ Students are very important to support cultural venues and events. 50% of the city theatre’s audience consist of students.

Figure 3 Student numbers at OVGU



Some outstanding initiatives regarding science & society in Magdeburg

- The Long Night of Science. Every year in spring, the scientific institutions open their doors to the general public. The 2012 edition attracted 16,000 visitors.
- RoboCup Junior competition with 148 teams from 60 towns all over Germany, and the Senior Competition with 39 research teams from 14 countries. It attracts many young and research-minded people (target group for Magdeburg).
- “City of Young Researchers“ (2012): a competition organized by the foundations of some main companies (Robert Bosch, Körber, Telekom). The aim is to improve cooperation of universities and academic institutions with schools. The project intends to expand student’s perspective on training and career opportunities.
- Interactive science exposition in 2010 on Market Square (city centre), with 40,000 visitors in total, and huge media attention: there were more than 1,800 reports and news items
- To reach the “difficult” group of 14-16 year olds, the city is now discovering an app where youngsters can discover traces of science in the city.

5. Conclusions

The city has made remarkable progress over the last decades in several respects. Its population decline has come to a halt, the unemployment rate has dropped significantly, and student numbers have grown. These are significant achievements for a city in a relatively difficult situation: located in the former GDR, an ageing population, a large rural hinterland, and no international airport nearby.

Key actors in the city have shown a substantial degree of organising capacity, and consistently built up a science base over the last decades by investing in buildings, infrastructures, institutes, networks, and knowledge hotspots (the campus, the science port). There are promising new developments where science is connected to business, most noticeable in neurosciences, medical engineering and automotive, but also in other fields. The scientific institutes manage to attract substantial funding from outside.

The science base (universities + research institutes) has developed as an important economic factor in its own right, and also, there are interrelations with the regional economy. It creates economic spin-offs in several respects: new companies –though not that many-, additional funding through research collaboration, competitiveness improvements of regional firms thanks to working with academic institutes. The incoming students and researchers largely contribute to the urban economy and society. However, the system is largely dependent on public funding, which makes it vulnerable. Moreover, the economic “returns on investment” for the region are relatively low: many students leave the city after graduation, there are very few incoming corporate R&D investments, and despite the generous funding opportunities for innovation and R&D, there are few successful innovative SMEs in the region.

Connecting the OVGU (and research institutes) to local SMEs remains a challenge. The State (key funder of the scientific base) would like the university to play a stronger role in this respect, but the number of R&D intensive firms in the state is very low, and there is a large gap between scientific competences offered by the university and the more mundane needs of regional business. Thus, there is a tension between the ambitions of the State and the university. Moreover, career perspectives in the universities mainly depend on scientific performance, and this makes it difficult (at times) to involve scientists in 3rd mission types of activities. New incentives and rewards schemes may be needed to change this.

Leaders of the city and the scientific institutes have a common –though not always very explicit- agenda to make Magdeburg a “science city” with a strong knowledge-based industry. But it is not very clear whether strategies work, what the results are. Where does Magdeburg stand in terms of new business creation, development of skilled jobs, investments in R&D activity, etc.? Why do companies or skilled staff come to the city, or leave it? There is a lack of systematic information collection (data, indicators or more qualitative information) to assess the cities’ progress, through time, and compared to “benchmark” cities. It is advisable to develop a more systematic monitoring process to keep track of where the urban knowledge economy is going. This could help to steer future investments and policy interventions. There are several regions in Europe that can serve as an example (Twente, The Netherlands; Tampere, Finland).

The system of technology transfer support needs a rethink. There is a large array of organisations, programmes and networks that are charged with technology transfer or other forms of valorisation. The offer is large, initiatives partly overlap, and for companies or SMEs it may not always be clear where to go for what type of assistance. There seems to be room for more alignment and co-ordination in this respect, and also a better, and simplified

communication about funding opportunities. Moreover, existing support is mainly directed towards technological innovation and entrepreneurship, probably due to the industrial and engineering tradition of the city. There seems to be room to promote other types of innovation and entrepreneurship: social innovation, service innovation, cultural innovation, new business models, market innovations (including internationalisation) etc. Moreover, so far, most investments have gone into buildings, areas, and infrastructures. A reorientation maybe considered towards human capital: training, skills, and new types of collaborations.

The scientific profile of Magdeburg is not very outspoken. There are many research schools and groups, in a variety of fields, with varying degrees of excellence, and varying ability to attract external funds or contracts with companies. Being a mid-sized university, OVGU may consider to limit its research scope to fewer areas (perhaps interdisciplinary fields), and become truly leading in them. A few fields already seem emerging as world-class (medical engineering, neurosciences). The lesson from those fields is that excellence results in more funding, attracts better researchers, and also attracts business (Siemens, in the case of medical engineering).

Magdeburg does not stand out in terms of “selling itself” and communication about its achievements as a knowledge/science city (an attitude with deep cultural-historic roots). A strong and consistent marketing strategy is necessary in a highly competitive world with many cities and locations competing for scarce resources. Magdeburg’s stakeholders may need a convincing, recognizable and distinctive “story” about Magdeburg as science city, that is real, and can be told not only in glossy magazines but by all the stakeholders in different podiums and networks. This common story-building process should be part of a larger strategy and open debate about the future of Magdeburg as a viable and attractive city of science and knowledge.

Quality of life is generally recognized a key location factor for skilled people and knowledge-based firms. Magdeburg is a liveable, mid-sized city with many amenities of good quality. However, some more “buzz” may help to become attractive as a student city and a city for knowledge workers, in the light of heavy competition from other student cities in Germany. Students may play a key role here: it could be considered to give them more room for “experimentation” in the city, i.e. allowing for artistic expressions in empty buildings, or shop windows. Also, students could be more involved in city policy. Internationalisation deserves priority attention, at the university (offering more courses in English) but also for the city, if it wants to play a role in the international battle for talent.

City and university need each other to improve quality of life and buzz in the city. Overall, in Magdeburg, the collaboration between city and universities/research institutes is very strong and fruitful: there are well-functioning co-ordination platforms, at political and operational levels, resulting in many joint actions –the long night of science, the Campus & City initiative, and many more. Some improvement is needed regarding the integration of the campus area (owned by the university) and the Science Harbour area (owned by the city, with many research institutes located there). Some barriers between the areas have been removed, but it is advisable to work on a comprehensive common agenda for the development of the entire area. After all, it is the “flagship zone” of the cities’ knowledge economy, at an excellent location between the river Elbe and the city. A strategic “relaunch” is needed to reinvigorate the stalled development of the area.

Annex 1: Detailed List of recommendations

During the peer review, three groups of 10-15 people each reflected on the question how universities and research institutes could contribute to a stronger urban/regional economy, based on information obtained during the first day of the seminar and the baseline study. Each group consisted of a mix of local people (knowing the local situation well), and project partners from abroad. Each group shared observations (based on presentations on day 1 and the excursions), and developed a set of suggestions and recommendations. Below, they are elaborated. First, we describe a number of observations that were made in the groups, concerning Magdeburg in general and the collaboration between city and university regarding economic development. Next, we present ideas and recommendations.

Observations

Within the groups the participants started with sharing their observations concerning Magdeburg in general, and the observed cooperation between city, university and other stakeholders. Here is a summary:

It is a great asset to have a university campus and a science port next to each other, and so close to the city centre.

The image of Magdeburg is much more negative than the reality; few people know it as a city of science

The city is difficult to “read” for visitors; it lacks clear reference points

Students are not very much stimulated to start a business

Teaching at the universities is too theoretical, disconnected from the real world.

There is a lack of awareness and engagement regarding technology transfer among many professors in the university.

Business / industry is not visible at the campus. Physically at least, business and academia are fully separated.

The city and the science institutes work together well. They are able to take a longer-term perspective, and conduct consistent policies, seemingly based on political consensus that science is an important pillar for the city's future development. Some project partners of EUniverCities wish they managed to have this at home.

There is a lot of funding around for innovation and tech transfer. This is an asset in its own right.

The technology transfer landscape is very complicated, it is difficult to understand where to go for what. More alignment is needed.

There is no clear picture/story of what makes Magdeburg special as science city or knowledge city. A clear profile is lacking. The same story goes for the OVGU.

How are the universities' mission aligned with the one of the city? That is not very clear.

How does the city attract investors, and to what extent do city administration and university collaborate in this field?

Suggestions and recommendations

Consider making the city-wide strategy-building process more concise. Tampere created a small strategy team, meeting every 3 months, that develops the main lines and monitors progress. The strategy building process in Delft led to a focus on a few key competence fields, very close to the city's history and tradition.

Consider creating a one-stop-shop for technology transfer. Aachen has one, as an umbrella of about 20 organisations.

Design a smarter strategy to discover interesting inventions at the university that may have market potential, and to realise that potential.

The city, as "independent" player, could become the central co-ordinator of technology transfer support

Developing links with Eastern Europe and also Vietnam –emerging regions- could offer opportunities, i.e. in attracting foreign students or researchers, or develop research collaborations. Ties from the past could give Magdeburg a lead in this respect. Some tools: recruitment offices, strategic alliances, joint master programmes.

City and university need more dense, intense places with a distinct "academic atmosphere": a climate where curious people meet, discuss, and develop new ideas. Also there seems to be a lack of places where students can study, or do group work.

Students must be more involved in city policy. They are a substantial yet underrepresented part of the population, and their input can be fresh and innovative.

Consider setting up a student incubator, where students can elaborate new ideas, and may use infrastructures and technical support.

Consider appointing "account managers" that help SMEs (but also start-ups, during and after the start-up phase) to find funding and other support.

Create a network of incubators in the region, perhaps co-ordinated by the university. The network can speed up learning and generate synergies.

Give students the opportunity to develop their own cultural activities in empty spaces/buildings in the city

Use Otto in a more creative way, i.e. as a comic figure

Supply city parks with free wifi

Diversify the tactics for being an attractive city beyond business creation and technology transfer. Include cultural policies, creative industry, and engagement.

"Champions" are crucial to bring about change: Influential "changers" (not always the formal leaders), with local commitment, fresh ideas, and readiness to think outside the box of their own immediate interest or organisation. It is important to identify those champions and put them in charge to realise change.

Consider developing the upcoming interdisciplinary field of neuro-economics; OVGU seems to have a good starting position.

There are many opportunities to incorporate technology in public spaces in a playful way. City&university may explore whether students and researchers could work on this together with the urban planning department.

To reach more international students, more bachelor and master courses must be offered in English

Academic education could become more attractive if theoretical teaching would be complemented by other teaching methods, such as teaching case studies, real-world assignments, and having more excursions and/or guest lecturers from the industry. This could also help to close the gap between academia and business.

Many students spend some months abroad in exchange programmes; when they come back, it makes sense to collect their impressions and experiences, in order to learn from that and to improve education and facilities in Magdeburg.

Annex 2 additional information on research institutes and tech transfer organisations

Technology Transfer Unit of the OvG University

The unit is embedded in the university, and employs 10 people. Its areas of work are:

- Technology transfer: it runs a research portal for the state, where companies can find partners; making clear descriptions and portraits of professors and postdocs;
- Fairs and events: presenting OVGU expertise at all sort of exhibitions and events
- Organising visits to companies with students and staff
- Support in research funding: helping scientists and management to find funding and applications; special support for EU funding; training courses, webinars
- Support researchers with patenting, licensing and contracting concerning research collaboration and IP issues. 12 national patents were granted, another 13 are still in the process

The main areas in which technology transfer takes places are:

- Medical Engineering
- Renewable Energy, smart power grids
- Particle technology/Fluidized-Bed-Technology

The unit is steered by the rector and the Vice President for Research, Technology, and Equal opportunities. Of the 10 employees, 4 are funded by the university, and 6 out of projects.

Funding lines of the development bank

1) Research and technology projects; here, regional companies can apply for loans and grants to develop new or innovative products and processes, to strengthen the technical and economic performance, to take over above-average risks of development projects, and to improve cooperation with research institutes and universities. For research institutes and universities, the bank funds innovative technology projects on product and process development in the field of industrial research and experimental development. It subsidizes individual projects or collaborative ones in which companies and or institutes/university groups work together. Funding is available for staff expenditures, technical equipment and instruments, orders to third parties and materials.

2) Knowledge and technology transfer. Here, SME may ask financial support for consultancy services (e.g. technical support, services of technology transfer, consultancy on regulation, IP and licensing), as well as services that support innovation (e.g. data bases, market research, lab use, consulting concerning quality, testing and certification).

3) "innovation assistance". In this line, for regional SMEs, funds are available for recruiting and employing of graduates of universities with a degree in engineering, science or economics. Reinforcement of knowledge transfer from universities in companies

Annex 3 Programme of the meeting

Monday, March 4th

Arrival of European guests

19:30 – 22.00 Welcome dinner

Tuesday, March 5th

8.45 a.m. Arrival of all project participants at the Town Hall in Magdeburg

9.00 a.m. Opening and Welcome Mayor Dr. Lutz Trümper, City of Magdeburg

9.10 a.m. Welcome Principal of Otto-von-Guericke-University, Prof. Jens Strackeljan

9.20 a.m. Introductory speech - City of Magdeburg – Challenges, Dr. Klaus Puchta, City of Magdeburg

9.40 a.m. Introductory speech – University Otto-von-Guericke-University, Prof. Volkmar Leßmann

10.00 a.m. Economic Situation Department for Economic Affairs City of Magdeburg, Jörg Böttcher

10.20 a.m Financing and funding opportunities for research and development, Investitionsbank Sachsen-Anhalt (Development Bank of Saxony-Anhalt), Claudia Zott

10.40 a.m Q& A Session, Lead Expert, Willem van Winden

11.00 a.m Coffee break

11.30 a.m. Technology Transfer and Entrepreneurship Prof. Matthias Raith

11.50 a.m. Awareness of entrepreneurship while studying – Profil study web-founder Prof. Graham Horton

12.10 a.m. Research Area Automotive, Innovation and Founder Center Magdeburg - Profile and priority, IKAM (Institute of Automotive Expertise), Dr. Jürgen Ude / Melanie Driessner

12.30 p.m. Lunch Town Hall

13.30 p.m. Transfer - IKAM (University) By Bus

13.45 p.m. Site visit IKAM (Institute of Automotive Expertise), Dr.-Ing. Stefan Schünemann

14.15 p.m. Transfer to the Port of Science (By Bus); Guide: Judith Mackay, Town Planning Department, City of Magdeburg

14.30 p.m. site visit GalileoTest Bed, Andreas Müller

15.00 p.m. Transfer ExFa (Experimental Factory)

15.15 p.m. Site visit Forschungscampus STIMULATE (Solution Centre for Image Guided Local Therapies), Prof. Georg Rose

16.00 p.m Coffee Break EXFa

16.20 p.m: Magdeburg-Stendal University of Applied Science, Prof. Dr. Jan Mugele

16.40 p.m. Reflection of day 1, Planning day 2, Willem van Winden

17.00 p.m end of the working session

19.00 – 22.00 p.m. Dinner , Lukasklause

Wednesday, March 6th

09.00 a.m. Key note speech – Technology Transfer Dr. Martin Raditsch, (Heidelberg)

10.00 a.m. Peer Review sessions

12.30 p.m. Lunch

13.30 p.m. Peer Review sessions

16.30 p.m. end of the working session

16.30 – 18.30 p.m. sightseeing tour (optional)

19.00 – 22.00 p.m. Dinner Restaurant ELBE

Thursday, March 7th

09.00 a.m. Presentation of group sessions outcome

10.15 a.m. Discussion on main URBACT issues

12.30 p.m. Lunch (optional) and departure