Planning for the urban knowledge economy: A new campus concept in Aachen, Germany

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1. Introduction

In June 2010, a delegation of 8 European cities visited Aachen to learn more about the ambitious and highly innovative new campus development there. The study trip was part of the REDIS project, that deals with the question how to develop urban 'hotspots' for the knowledge economy. We obtained lectures from a number of stakeholders involved, and had intense discussions with them. This short report summarizes the findings from the trip. After giving some background on the city (section 2) it describes the vision, strategy and business model for the campus (section 3), its physical appearance and phasing (section 4); finally, it raises some questions, issues and themes that popped up during the discussions with the various stakeholders.

2. Background

Aachen is a medium sized town in the West of Germany situated near the border of Belgium and The Netherlands. Its economy was long dominated by the mining industry, and after the closure of the mines in the 1970s and 1980s, many people became unemployed. The city had to look for a new economic future, and the university was seen as a key catalyst for that. The city has a large technical university, one of the largest in Germany: The RWTH Aachen University (Rheinisch-Westfalische Technische Hochschule). The university has the full range of technology and science disciplines, and is oriented towards applied research. Some years ago, it received the 'excellenz' status, putting it in the top league of German academia.

Until recently, the city failed to fully reap the benefits of having a university. Aachen does not have a large-scale technology sector with big establishments of industrial giants like Siemens and BMW. Typically, after graduation, talented

students leave the city for the south of Germany (Munich, Stuttgart) where most technology jobs are.

Some basic facts about the RWTH
30,000 students
Budget: €658m (2009)
Third party funding: €227m (2009)
450 professors
262 institutes, 20 large ones and 4 Fraunhofer Institutes

But things have changed for the better. For one thing, city and university have promoted the entrepreneurial climate in the city, and have supported start-up companies in many ways. Over the last decades, a number of technology-related new firms have developed in Aachen, some strong clusters have emerged, and private labs have opened their doors. Also, in the last years, the RWTH has managed to attract substantial contract research activity. Currently, it is the largest German university in terms of contracts with business, with an annual €227m income from projects with the industry.

That strength is now being elaborated in the new campus area. At two sites, a new campus is being developed, with total expenditures as much as €2b. It is expected that the new campus will generate an additional 10,000 jobs in the city of Aachen. The university created a special vehicle, the RWTH Aachen Campus GmbH, in order to realise the project, and to realise a 'cluster-based' development model in which the university co-operates strategically with technology companies to the benefit of both sides.

3. Vision, strategy and business model

It is the vision of the university to make the campus a *catalyst for research and a trigger for innovation.* The leading person behind the development of this vision is Prof. Günter Schuh, Vice-Rector for Industry and Business Relations at RWTH; in his view, in the current stage of industrialisation, academia and business need each other to prosper and innovate, and physical proximity is a key condition for success.

The distinguishing feature of the campus is its innovative concept. It is based on clustering academic institutes and companies around multi-disciplinary themes or shared challenges. The idea is to achieve synergies by literally putting them together in a 'sub-cluster' and let them work together. The basis for a mini cluster is research. Internally, the RWTH has identified a number of strong research themes (multidisciplinary, with sufficient critical mass). In the first phase, six clusters were approved by the board: Photonics, bio medical engineering, logistics, integrative production technology, sustainable energy, and heavy duty& off highway powertrains. These clusters are to become hotpots of knowledge creation, diffusion, and application. University institutes have an incentive to generate '3rd stream' income by co-operating with the industry. It increases their budgets and status, and they can re-invest the additional revenues.

The Campus GmbH invites industrial companies to locate near these institutes at the campus. Not any firm is welcome, however: there are strict admission criteria. To be allowed at the campus, firms have to sign a long-term R&D framework contract in which they commit themselves to conducting contract research with the university, in a particular cluster-field, and also to deliver lectures at RWTH. A firm has to sign a 10-year lease contract, and must actually base part of their (research) staff at the campus premises.

The aim of the concept is to improve the quality, scale and relevance of research in the various fields by mixing the resources and knowledge of business and academia. Also, the university hopes to improve the quality of teaching by having lectures from industrial partners –university professors always carry end-responsibility. The latest insights from the business world are transmitted to the students. Moreover, employees of the 'embedded' firms can take Master courses at RWTH at reduced rates, and in part-time.

The new campus will develop as a patchwork of 'mini-campuses' focusing on a particular technology field, with university institutes, firms, and also service companies or public research institutes like Fraunhofer. The strong point is that research is always central stage; the university stays in charge but captures the knowledge embedded in industrial firms, and expands its financial possibilities. In applied research (like wind energy, combustion engines or new materials) it makes sense to co-operate with industrial partners and have real and long-term commitments.

The 'Aachen model' is a strategic approach, much more than is common in Europe. Importantly, co-operation is never exclusive and may never block new developments. Any institute keeps the right to sign deals with other industrial partners who are not on the campus; new clusters may emerge, and spinning out is encouraged.

Figure 1. Partners in a 'mini-campus'

Matriculation is the term the university uses to indicate this way of integrating firms into the university. By 'matriculating', companies gain a special position: They get influence on research focus of the coming years, they obtain discounted access to R&D-services of the university and teaching and further education offers of RWTH Aachen for the 'matriculated' staff members. And, very importantly, they have direct access to the best new talents of the university.

The campus will evolve as a patchwork of clusters, but each one has to be large enough to allow for specific investments in facilities like laboratories. New clusters can be set up only when a sufficient level of 'critical mass' is achieved. There must be at least 150 staff members (and a realistic growth perspective to have 350 staff in 3 years time), 10 research partners, 2 university institutes, and 9000m2 of rented property. The initiators of a new cluster are typically one or two key professors, in co-operation with an industrial partner.

The concept seems to work. By the time of writing, 82 firms had signed a letter of intent for a long-term co-operation contract, and will locate at the campus. Most of them were not located in Aachen before. City and university expect to attract some 5,000 researchers in the next years, thanks to the campus, and new housing projects are planned accordingly. One key reason why firms are interested in the concept is the early access to skilled graduates. In an ageing society, this factor becomes ever more important.

Business model
A key player in the development is the state-owned company BLB-NRW (Bau- und Liegenschaftsbetrieb NRW). This organisation owns and develops public real estate in the State of NorthRhine-Westphalia, and it is the planner of most public works. It is the owner, builder and developer of the new campus areas. The physical infrastructure (roads, sewage etc) is developed by the state of North Rhine Westphalia. This is an investment of about €50m for each campus area.

The clusters at the campus will not all be the same: dependent on their specialisation, they need specific facilities, or buildings have to meet specific demands. To cater for this, the tenants of each cluster (firms or institutes) can specify which type of facilities they need, and the design of their buildings is adapted accordingly. In return, they have to sign 10 years lease deals.
Private investors are invited by the Campus GmbH to finance these buildings (and pay a leasehold to BLB), but they do not have a say over the selection of tenants. The Campus GmbH (95 owned by the university, 5% by the City) is the landlord of the campus premises and buildings. It specifies the building requirements, and decides who can rent premises and who cannot, based on its sub-cluster strategy.

Each cluster is led by a professor, and this person also has a seat in the Campus GmbH. The Campus GmbH is the legal body that signs the contracts with industrial partners, subcontracts other institutes in joint projects etc. A

percentage of the revenues (2-3%) are kept by the Campus GmbH to cover the overhead costs.

Private investors are invited to invest in the new campus buildings (they lease the land from BLB) and get the rent revenues, but they are not the ones to select the tenants. This approach also implies that they don't have to marketing and acquisition. So far, there is ample interest from investors to involve in the development of the sub-clusters. Importantly, rent levels are market-based, there are no subsidies involved, to make sure that firms don't come for the low rent.

4. Physical lay-out and phasing

The new campus will be developed at two different locations: The Campus Melaten (Phase 1), and the Campus West (Phase 2).

In the Melaten Area (473,000m2), construction has already taken off. This area is situated at the northwestern edge of the city. Figure 2 shows an artificial aerial impression of the development, based on a Masterplan designed by an architect agency. It will be developed as an open area, home of 11 clusters (25,000 m2 each), as well as a number of facilities such as restaurants, shops, a hotel, a training centre/seminar building, and cultural amenities. The visitor functions and services are to be concentrated along a green boulevard. The area should become not only a place for working but also for leisure and entertainment. The development plan for Melaten was adopted in 2009, and in 2010, preparations for the construction have begun.

Figure 2 The Melaten-campus

Figure 3 Campus West

The next stage (the Campus West, see figure 3 for an impression) will be developed along the railtrack (at walking distance from the city centre), in an area that is now derelict and messy. This area is to become the home of eight additional clusters, and also, the university intends to build a convention centre and a new library there. It has a size of 325,000 m2. Unlike in the Melaten area, housing will be developed here as well. Developments are planned to start in 2011.

5. Some issues and questions

The campus concept does full justice to the cross-disciplinary nature of applied research and development work. The clusters are all centrered around a multi-disciplinary field rather than one particular technology, and this reflects the way new products are conceived: every complex industrial product contains a whole variety of technologies. Also, the concept is a way of formalizing and strategically embedding the relations between academia and industry, and translating this into a campus concept. Remarkably, as one of the first universities in Europe, RWTH gives clusters a formal place in the university hierarchy.

By asking long-term commitments from industrial partners, a stable 'innovation ecosystem' is created where long-term investments prevail over short-term gains. At the same time, there could be entry barriers for newcomers (new innovative small firms, new research fields); Once the premises of a cluster are rented out, there may be no more room for them. It must be noted that the institutes are free to engage in relations with any new firm regardless of their locations. But how flexible will the concept prove to be in practise?

For other cities in Europe and beyond, Aachen can be an inspiring example how to capitalize on the university as an economic engine, and how to build a campus around a sound concept. However, it is questionable to what extent the concept is transferable to other cities. In principle, the conceptual model of linking business and academia in 'subclusters' and embedding them in the academic

hierarchy could be replicated elsewhere. But Aachen has some specific features. One of Aachen's key strengths is the broad scope of the university: it covers the full breadth of science and technology fields, with several pockets of excellence, and this is in fact a pillar under the cross disciplinary approach in the clusters. Not many cities will have excellence in so many different technology fields. Also, the university builds on a relatively strong experience and track record of contract research. And finally, the smooth relations between city and university do not prevail everywhere, but they are a condition for success.

An issue for the city of Aachen is whether the new developments will have an impact on the existing locations and premises of the university. Currently, many of the university's premises are located near the city centre. It is expected that the new campus areas will not make these buildings redundant. Rather, according to the university, they cater for the much-needed additional space. It is expected that educational functions will remain in the city centre mainly, whereas the new campuses will be the places for large-scale research labs and business activity.

In Aachen, we learned that relations between the university and the city are relatively smooth, and have been so for a long time. Twice a year, a formal 'summit' is organised, but also informal contacts are said to be good. Nevertheless, one may note a certain dominance of the university in shaping the cities' future. The Campus GmbH is 95% owned by the university, and only 5% by the city. But this organisation will make a deep impact on the urban economy and the city's future perspective, with lasting impacts on the population at large. This raises questions about citizen participation and involvement.

Concerning the business model, the Aachen case is highly interesting because it is market-driven. Unlike in many similar developments in Europe, there are no subsidies or reduced rents involved. Firms have to pay the full commercial price, while the university remains in charge.

The concept relies on the idea that the agglomeration of business and researchers at one location will generate innovation, because it helps to foster interaction, knowledge exchange and joint development. However, several recent studies show that local networks are not that important for innovating companies; they get their knowledge on a national or even global level, and know how to 'tap' knowledge from everywhere. Will companies come to the campus just to recruit te best talent (or to have a nice location on a new campus, which can be attractive anyway), and to what extent are they really interested in the co-operation? The companies are obliged to sign contracts, but at €10,000 as a minimum, the amounts involved are not necessarily substantial. Time will show how the local networks involve.

In terms of urban planning, the new campus can be criticized for being too mono-functional, especially the first-phase development at Melaten. Here, one can expect little life after working hours, despite the presence of some amenities like restaurants, bars etc. It is questionable whether the area will attract people from outside who do not have to be there for work. Will there be sufficient

‘critical mass’ to sustain a wide variety of amenities and facilities like restaurants, shops, leisure facilities in the area?

For more info:
http://www.rwth-aachen.de/go/id/zdb
And a presentation about the plans: