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Heidelberg Bahnstadt - City of Science

WORKSHOP 1

STPs, science cities and urban strategies

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Executive Summary

Heidelberg Technology Park (HTP) is the oldest and largest German Technology Park focused on Life Sciences. Actually it operates 800,000 sqft at five sites within the City borders. The most important academic partner is the Ruperto Carola Universität established in 1386. The research and education pool and was later on accompanied by University Hospitals and world renowned research infrastructure, e.g. DKFZ and EMBL plus collaborative industry projects. Heidelberg´s positive experience with setting up and running the HTP led to the decision to create not only a new STP but a whole district aiming at the integration of science and commercialization of knowledge in the center of a city suburb. Heidelberg repurposed the freight yard area and built up the Bahnstadt district from the scratch. Here science and industry will be growing within an energy efficient residential district adjacent to the Old Town. The project will be supplemented by the conversion of American Forces barracks starting in 2014.

Introduction – STPs in Germany

Since the foundation of the first German Science and Technology Parks in the early 1980s the number of parks has steadily risen up to more than 350 STPs leasing space to more than 14,000 companies today. German STPs have generated almost 250,000 jobs in 27,000 start-up companies. 90% of these companies moving out of a STP have been successful, 5% were liquidized or merged with others and only 5% became insolvent.
Nearly 60% of STPs are connected to research facilities and universities, and more than 30% are connected to industry, while less than 25% were set up on rural grounds. German STPs focus on technology transfer from academia to industry via entrepreneurs and start-up companies and typically offer sophisticated infrastructure plus services. Generally German STPs are instruments of regional or local economic development strategies and seldom are solely run on a private, profit-driven basis. They are typically owned by public authorities and regional corporations, i.e. cities, counties, banks or chambers of industry and commerce.
Tenants regularly originate from academia (universities, technical colleges, federal basic research institutes) and keep on co-operating with the parent institution while fostering ties with small and medium sized companies (SMEs) and Global Players of the corresponding industry branch[1].
Depending on the innovation focus of the STP and its surrounding cluster a dedicated and cost-intensive infrastructure, i.e. labs, clean rooms, needs be offered if the upfront investment of a start-up shall be minimized significantly. Secondly the STP should be run adjacent to excellent research infrastructure and easily accessible by public transportation in order to ease communication and creativity while reducing commuting costs of start-ups and their employees.
Consequently an idealistic (public) STP will therefore heavily compete with private real estate and governmental research building projects, especially in traditional and spatially limited "Science Cities", like Heidelberg, growing for several centuries together with its distinguished university.
Early STPs were stand-alone real estate objects and strived to sell parcels to companies while having few or no ties to a university or research institute. They seldom offered SME supportive services and spun networks integrating academia, industry and corresponding governmental institutions. Individualized and supportive services for tenants were established during 1990s.

[1] G. Baranowski, B. Dressel, A. Glaser: Innovationszentren in Deutschland 2010/11. ADT-Bundesverband Deutscher Innovations-, Technologie- und Gründerzentren e.V.; Berlin 2010, p.29-57

Today STPs are one of the most important economic drivers for the region with increased thematic focus, in-depth support to entrepreneurs and a self-understanding of creating and offering an open innovation platform where industry and science co-evolve. The commitment of local research institutions and universities is constantly rising, as is the interest of the industry in participation, and they might be offering accelerator or incubator space themselves. Non-university R&D organizations like hospitals, federal laboratories, and public or private research organizations also use STPs to leverage their assets and resources in order to create economic growth. Modern STPs ideally are located in the city center, i.e. amidst public live. They themselves offer or are surrounded by amenities like nursery, conference centers and recreational facilities.

Heidelberg Technology Park History

Heidelberg is not only internationally renowned because of its cultural heritage sites, e.g. the Old Castle, and as being part of Germanys Powerhouse, the Rhine-Neckar metropolitan region, but especially for its excellent Research and Science Institutions, the German Cancer Research Center, headquartesr of the European Molecular Biology Laboratory, the Ruperto Carola University, the oldest university in Germany, and the University Clinics, plus Collaborative Research Initiatives like the National Center Tumor Diseases, Catalysis Research Lab or the Heidelberg Ion-Beam Therapy Center and Forum Organic Electronics. Heidelberg therefore is also characterized as a City of Science with a very high percentage of academic inhabitants surrounded by a lovely and refreshing landscape.

Heidelberg Technology Park is the oldest and largest German Technology Park focused on Life Sciences. It operates 800,000 sqft at five building complexes within the City borders:

a) the old slaughter house which was converted mid 1980s into the BioProduction Park,
b) the 1st to 4th construction stages within the university campus “Im Neuenheimer Feld” that were set up in the years 1984, mid 1990´s, 2001, 2012 according to the needs of the growing biotech and medicine industry,
c) the Environmental Park, a reconstructed industrial building,
d) a Start-up-Center for Femal Entrepreneurs, and
e) Skylabs, the first building of a new campus offering almost 200,000 sqmft office and lab space.

The HTP concept was formulated during early 1980s when the Lord Mayor, Reinhold Zundel, the Rector of the Ruperto Carola Universität, Adolf Laufs, and the Premier of Baden-Württemberg, Lothar Späth, decided to set up a Technology Park. Shortly afterwards the Lord Mayor and the President of the Chamber of Industry and Commerce Rhine-Neckar founded Technologiepark Heidelberg GmbH, the managing company, and opened the first complex of buildings together with a private real estate company, Roland Ernst Group, in 1984. In parallel the old slaughter house of the city was repurposed.
The first biotech company Orgnogen was a spin-off from the Max-Planck-Institute for Medical Research Heidelberg in 1982 and moved into the BioProduction Park. Repurposing the old slaughter house was done due to the fact that Orgnogen, later renamed as Orpegen, and other tenants like GenBioTech (today called Biomeva), Biopharm and Glycotope Biotechnology, needed space for their production and manufacturing, i.e. high ceilings and buckling loads that were not intended in the newly constructed HTP buildings. The new sites on the university campus offered sophisticated labs and offices with standard ceilings. Rental space was ready to use for start-ups that only had to bring in their special equipment. In contrast Orgnogen and others had to reconstruct the slaughter house premises according to individual needs themselves.

Heidelberg´s strategy to renovate the slaughter house might serve as a good example for some STPs worldwide that were and are shaping cities actively and are able to change its social structure, e.g. Biopark of the University of Maryland. Above mentioned creator of the HTP, former Premier of Baden-Württemberg,Lothar Späth, transformed the positive experiences when he became CEO of Jenoptik GmbH. Jenoptik GmbH was spun off from former East German People´s enterprise, VEB Carl Zeiss Jena, employing 30,000 people before the German reunification in 1989. Späth created the market-listed Jenoptik AG with 2,000 employees at the time of the IPO. He was responsible for several other Zeiss spin-offs and the

creation of the Beutenberg Campus plus the STP *BioInstrumenteZentrum Jena*. These activities minimized the risk of mass unemployment in Eastern Germany. Besides these extreme examples of positive socio-economic effects STPs are always intended to be *Think Tanks* that enable and establish innovative forms of interdisciplinary co-operation by eased communication between science, industry and financing institutions. STPs therefore play a substantial role in market-oriented technology transfer and in developing high-tech products, services, i.e. strategies to face the challenges of a rapidly growing world. Demographic changes in industrial nations, environmental issues in developing countries, the need for resource efficiency, and optimized crops or agricultural production systems might serve as a handful of examples targeted by STPs and their tenants

Heidelberg Technology Park –Status Quo

HTP building complexes I-IV on the university campus were exclusively set up for private companies dealing with medicine, pharma, biotech. This is remarkable and in contrast to conditions in Northern American STPs or elsewhere. Often roughly 15% of their space is rented to universities and the industry foci of the parks were seldom formulated. The HTP concept instead takes into account that it is located right on the university and clinics campus, also hosting the National Cancer Research Center, DKFZ, and collaborative industry projects, i.e. research insitutions do not have to be part of the premises but are adjacent neighbors. Tenants mix with researchers on a daily basis in co-operation projects and meet in the amenities. HTP nevertheless had to undergo the evolution any traditional STP has to cope with: from a real estate project with little specialized guidance towards a modern research and business ecosystem consisting of public research infrastructure, rental space for companies and adapted supportive services delivered by a management team plus a distinguished network of associated partners.

Actually HTP hosts more than 80 tenants focused on Life Sciences plus Environmental Technologies and Organic Electronics. ICT is playing a significant role in almost all aspects of HTP management and the businesses. IT start-ups are actually not within the HTP focus because ICT company needs are typically served by the local real estate market offering bureau space.
Besides the facility and rental contract management the HTP core management team supports business development, e.g. b2b-matchmaking, internationalization and training. Active recruiting of companies is partly done by co-operating with the local technology transfer offices. TTOs, the Chamber of Industry and Commerce and local colleges founded the Heidelberg Startup Partners in 2004 in order to proactively support and pick start-up ideas and nurse auspicious prospects. The team´s expertise is completed by a network of 150+ *Associated Members*, specialized on legal advice, patenting, financing, marketing, or human resources.

Heidelberg Technology Park today serves as a role model for STPs and has set up an international network of Sister Parks during the last 3 decades in order to ease the exchange of knowledge, personnel, services and products. It also has a tradition in being an active partner in multinational projects like AFIBIO, NetBioClue, ABC Europe, again in order to ease co-operation and innovation not only locally but also at the international level. Heidelberg Technology Park shares its experience gathered during the last 30 years regarding the creation and growth of a dedicated STP elsewhere and truly is an example of a non for profit, although self-sustainable and growing, economic development strategy.

Creating the modern Knowledge City – Bahnstadt Heidelberg

HTPs youngest evolutionary stage is the transformation of the HTP strategy onto the next level: the development of a knowledge and sustainability suburb in which labor, living and science are shaping and displaying the City of the Future.

The 1980s HTP concept obviously is still valid:

- lower the upfront investment of a start-up by providing sophisticated space,
- create knowledge networks and bridge cultural barriers between academia and industry,
- obtain funding for operations and buildings,

- provide supportive services for the tenants.

Highly industrialized societies have to overcome commercialization challenges in high-risk industries because they will not be able to compete with low-cost labor and production markets. Therefore modern STPs are serving as a role model for competitive solutions in industrialized countries. STPs will have to complete the above listed determinants and

- anticipate the changing nature of corporate R&D offering secure open innovation platforms,
- strengthen industry-academia partnerships and broaden the collaborative diversity,
- attract, train and retain the brightest and most creative workforce,
- focus on entrepreneurship and commercialize intellectual property,
- respond to increased competition owing to globalization,
- acquire financial sources and co-use expensive private and public research infrastructure,
- integrate excellent research and modern techniques into daily life,
- develop environment-friendly working and living spaces revitalizing suburbs and cities.

Bahnstadt is currently one of Germany's largest urban development projects. Covering a total area of 116 hectares, the new district is larger than Heidelberg's Old Town and will host 6,000 new inhabitants plus 7,000 new jobs. Roughly 20 hectares are reserved for industry and commerce; the research campus will occupy 5 hectares, while the rest will be used for residential, roads, public transport and recreation. The investment volume in the Bahnstadt district is in excess of two billion euros. This also entails the creation of public infrastructure to the tune of 300 million euros which will become property of the city – day nurseries, a school, a civic center, green areas, streets, walkways, cycle bridges and much more besides. Almost every administrative office of the City of Heidelberg is involved in the development – from urban planners, experts in construction law and the civil engineering department; to the city's local administrative office, the department of public welfare, the environment agency and the countryside protection agency, right through to the youth welfare office, the local education department and the Technology Park. They basis for the project was laid by intensive public participation and discussion of benefits and challenges. These public hearings are again intensively used in the conversion processes of the barracks formerly used by US American forces (300 hectares).

Bahnstadt and the conversion process of real estate formerly used by the US forces has become the focus of international interest. Many cities are currently looking for different ways in which to cope with population growth whilst curbing energy consumption and environmental impact. And with its high standards in sustainability, Bahnstadt is naturally a highly respected model. Mayor Dr. Eckart Würzner presented the concept as a guest speaker at various international conferences, for example within the framework of the C 40 Group – the network of the 40 largest cities in the world. Conversely, urban planners from Europe, Asia, North and South America come to Heidelberg to find out about the district at first hand, with the intention of using it as a model for sustainable urban development.

The ecological balance in Heidelberg's Bahnstadt is nothing short of impressive. In terms of energy efficiency, the new district by far exceeds national legal requirements, as set out in the current German Energy Saving Ordinance. CO_2 consumption is also less than half that of traditionally constructed buildings. Building owners and developers involved in the Bahnstadt development are provided with comprehensive guidance when it comes to energy issues so as to ensure compliance with the demanding energy requirements of the "passive house" standard. This also includes an outline of the various funding options available for energy-efficient construction. In addition to further sources of funding, the City of Heidelberg supports building owners by granting subsidies.

The remaining demand for energy is covered through ecologically responsible sources. Bahnstadt is supplied with heat via district heating; in the medium term this is to be generated in full from renewable energies. What's more all other miscellaneous building services equipment is also optimally energy-efficient. For example, thermal solar systems are utilized for the supply of hot water, and waste water recycling systems reduce water consumption. Dues to the fact that all households in the Bahnstadt development are equipped with intelligent energy meters,

or smart meters, inhabitants can keep constant track of their energy consumption and the entailed costs. Bahnstadt's inhabitants are not only able to make a valuable contribution to the conservation of resources and climate protection, they are also largely autonomous from rising energy prices.

The well-considered infrastructure in the new district oils the cogs of daily life. In October 2012 a neighborhood center, intended as a location for interaction, celebrations and other events in the district opened doors and strategies and planned activities of scientific and industrial users of the campus are communicated on a daily basis online, in newspapers and via events. Two nurseries and a primary school afford essential education and childcare amenities. The first day nursery, which caters for 60 children, opened in September 2012. First inhabitants are able to make appointments with representatives from the city's local administrative office, taking place in the neighborhood center. This provides the opportunity for formalities to be dealt with conveniently on-site. Additional local contact points for Bahnstadt inhabitants include the local administrative offices.

The Central Research Campus

Established by the non-profit Max Jarecki Foundation, Skylabs is a modern ensemble of several office and laboratory buildings with a nine floors tall tower overlooking the district, and a visible indication that the most modern research campus is developing in Bahnstadt. This growing campus is one of the HTP´s five sites. The energy-efficient Skylabs are located in close proximity to the 1980s BioProduction Park as well as to the research and development halls of the leading-edge cluster, *Organic Electronics*.
The complete Bahnstadt campus will be offering 1,000,000 sqft hosting research and education institutions surrounded by temporary housing facilities and a conference center. Attractive apartments, each with a living space of between 200 sqft (single apartment) and 400 sqft (double apartment) will be ideally suited to student life and leave plenty of scope for students to stamp their own individuality.

The new campus is intended to supplement the existing HTP sites on the university campus focused on Life Sciences, i.e. medicine, pharma and biotechnology. Grown-up companies and those not depending on a close proximity to the Life Sciences faculties and medical hospitals on the Neuenheimer Feld campus are invited to move over to the modern and representative Skylabs sites.

Secondly innovative applications and products made of conductive and semi-conductive plastics are at the core of the work carried out by the leading-edge cluster, Forum Organic Electronics. Materials are researched, components are designed and applications are developed for medicine and energy technology. One of the cluster's particular areas of expertise is the use of printing technology as a cost-effective manufacturing method for organic electronic components. The central research platform is called InnovationLab GmbH (iL). The Forum Organic Electronics cluster is made up of companies, universities and research institutes based in the Rhine-Neckar region. The core of the research platform, which has around 29,900 sqft of office and laboratory space, is a 6,500 sqft clean room laboratory, which was collaboratively planned and constructed according to the latest technical standards in a record time of just two years. Under the guidance of nationally and internationally renowned experts, over 100 researchers from the partners of the leading-edge cluster work together here on innovative, energy-saving lighting systems and highly efficient solar cell films based on printed organic electronics. High-profile researchers from the Max Planck Institute for Polymer Research, the Technical University of Braunschweig, the Technical University of Darmstadt, the University of Heidelberg and the Karlsruhe Institute of Technology are establishing the ideal conditions for the development of junior research groups with young scientists.

In the first phase of funding for the leading-edge cluster, the identification of fundamental technological questions and the construction of the central research platform shaped the development of the cluster around iL. Now, the focus is upon implementing the developed laboratory procedures into an industry-oriented process environment. The first jointly prepared demonstrations were presented at the 2012 Drupa trade fair, for example. The major involvement of the companies BASF SE, Merck KGaA and Heidelberger Druckmaschinen AG

makes a new style of public private partnership possible. As part of the BMBF Leading-Edge Cluster Competition, InnovationLab received a total of up to 40 million euros over a period of five years for the implementation of its cluster strategy. This commissioning marks the cluster's second major milestone after having won the 2008 BMBF Leading-Edge Cluster Competition and had to be mirrored by private investments creating an investment volume of 80 million euros.

Summary

Heidelberg Technology Park displays a tradition covering 30 years of specialized economic development activities. The strategy was and is supported by research institutions spearheaded by the oldest university in Germany, Ruperto Carola Universität, established in 1386, the local industry and regional authorities. The rental sites were planned and financed by private investors on grounds owned by Heidelberg or the Federal State Baden-Württemberg. Technologiepark Heidelberg GmbH, a management company of the City and the Chamber of Industry and Commerce Rhine-Neckar, is responsible for the selection of tenants and dedicated supportive services. The majority of the HTP tenants today are focusing on Life Sciences and are intensively co-operating with the corresponding faculties, hospitals and Federal or European basic research institutions, i.e. German Cancer Research Center and EMBL. Actually a minority of tenants is dealing with environmental technologies, ICT, or physics. Recently this innovative knowledge pool was supplemented by a substantial public private partnership, the leading edge cluster Organic Electronics managed by the so-called InnovationLab.

Heidelberg will expand the positive experience of the existing HTP by developing a modern, environment-friendly district serving as a role model for modern communities and industrialized societies. The center of the Bahnstadt district is made up of a new campus entirely developed by the Max Jarecki Foundation. Skylabs, the first out of five building complexes, started offering office and lab space and completes the BioProduction sites in the cities´ former slaughter house and the clean rooms of the cluster Organic Electronics. The newly constructed district therefore has to be seen as a huge STP itself, which anticipates modern trends of technology transfer and commercializiation. It is self-sustainable and offers every facility needed to succeed and grow: collaborative, open innovation platforms connecting the business and academic world in order to facilitate the translation of knowledge into competitive products. It also consists of top-modern housings and amenities to support social life and creativity of scientists, businessmen, workers and their families, integrating research and start-up companies into the society.

PS My talk will be illustrated by impressive photographs and maps of the Bahnstadt and the Skylabs Campus.