ENVIRONMENTS FOR WORKING
IN A KNOWLEDGE ECONOMY
experiences from Dublin, Helsinki, Magdeburg & Eindhoven

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Creating inspiration! That's the purpose of the excursion to the High Tech Campus in Eindhoven. To generate experiences about campus developments and exchange thoughts about the potential role of these environments for working in city (re-)development. This publication exhibits the crucial focus points in area development for environments for working in a knowledge economy and reads like a guide to the excursion in Eindhoven.

The publication is build up in ten chapters. After this short introduction, it starts with a warning. With reasonable doubts about the added value of knowledge parks in literature, but nevertheless the huge amount of initiatives in reality. It's an apprehension which makes clear that the success of knowledge driven area development is not self-evident and therefore poses a main question: How can area developments for working in a knowledge economy can be defined best?

Based on research at the Erasmus University in Rotterdam, this publication offers grip in search of answers to the question above. By appointing several levels of scale in attention. By reflections on the fundamentals of a regional knowledge economy and determining the success factors in it. By mentioning the importance of clear intentions and the role of perseverance in (spatial) quality of the area development. And by optimizing the knowledge management on the spot. In short, it sketches a broad complex of aspects, gathered in the Checklist Area Development in a Knowledge Economy which visualizes the chances and threats of successful developments.

Naturally, this publication doesn't stop with theory. Four northern European 'best-practices' (in Dublin, Helsinki, Magdeburg and Eindhoven) are elaborated in brief articles. Each of the cases is explained according to the Checklist, by which mutual differences and similarities, success and fail factors become clear and negotiable. Especially the case of the High Tech Campus is extensively explained, with detailed descriptions about the quality of the park concept and the performance of the park management on site. It includes a 'tour guide', which literally shows how the theoretical notions on creating environments for working in a knowledge economy are translated into the reality of the park.

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added value of knowledge parks

The attention for area development in a knowledge economy is huge. This is reflected in various initiatives for business- and science parks, landscapes for working, technological valleys and campuses which stimulate (open) innovation. There are major differences, however. Some developments focus on one particular market segment (like Bio-Science, High-Tech or the Creative Industry), while others are more diverse and generic (like Science & Technology or Knowledge Parks). Some initiatives evolve around a university or knowledge institute, while others are developed by companies. In scale and size the initiatives vary from one single building to areas far beyond 100 hectares. In short, there is a rich variation. Yet, all initiatives have at least one important thing in common: the presumption that the development of an environment for working in a knowledge economy creates a certain added value.

This common presumption – knowledge parks create added value – is subject to reasonable doubts, however. Comparative research shows that performance differences of companies 'on' and 'off' knowledge parks are negligible. Yet knowledge driven area developments do contain an set of well documented advantages. The co-location of related companies and institutions offers scope for sharing expensive facilities like laboratories and clean rooms; it may help to reduce costs and gives small companies the opportunity to use 'state-of-the-art' facilities which they otherwise couldn't afford. Knowledge driven developments can also create an environment for bringing people and businesses together, and are suitable places for 'incubators'. Start-up companies and spin-outs have better survival chances when growing up in knowledge rich environments. And – last but not least – knowledge driven area developments can help to foster the identity of a town as a progressive knowledge city. This type of 'hotspots' can literally give a face and an address to the rather abstract concept of the knowledge economy.

As said, there are reasonable doubts of the added value of knowledge parks. Therefore, area development in a knowledge economy is not just about choosing a proper location, but about optimizing all potential advantages. The efforts to reach this integrated quality should focus on three levels in scale: the context, the cluster and the location.

checklist area development

1. regional knowledge base
2. economic base
3. quality of life
4. accessibility
5. diversity
6. scale
7. social equity

A. optimal cognitive distance
B. management of co-opetition
C. organisation of spill-overs
D. active promotion of knowledge diffusion
E. passive promotion of knowledge diffusion

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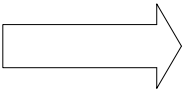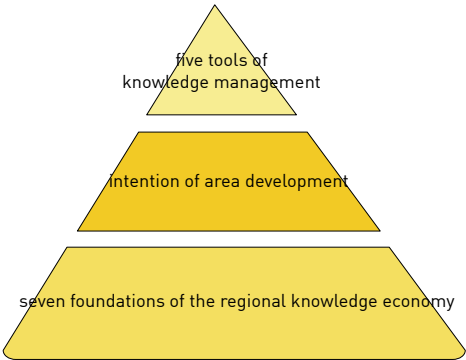
focus on added value

A knowledge-based working environment is never a stand-alone location. It's part of the regional knowledge economy and often part of a specialized cluster within it. Clusters are geographic concentrations of related companies, specialized suppliers, services, companies in adjacent sectors and associated institutions in a specific market, which compete but also cooperate. The success of any 'cluster hotspot' is strongly dependant on the regional knowledge base. Building 'cathedrals in the desert' is not really useful. A certain critical mass is necessary to generate a flourishing knowledge campus. But what should this knowledge base consist of? What determines the rates of success for cities, regions and clusters in the knowledge economy? And how does the region relate to the location?

Van Winden et al (2004) developed the 'knowledge house', as a metaphor which helps to understand how successful knowledge regions and economic clusters function. Within this knowledge house there are seven foundations of the regional knowledge economy.

A certain knowledge base (university, research institutes) is necessary, and a physical 'knowledge hotspot' can help to strengthen it. A visible campus for knowledge intensive activities may serve as an attractive anchor point for people and business where innovative ideas gather on a spot which creates dynamics which otherwise wouldn't occur. But how can these dynamics be shaped? What are the dominant motives behind an area development of this kind? And which forms of knowledge management are useful?

Van de Klundert and Van Winden (2008) offer insights in the role of quality of park concepts and the management of locations in the knowledge economy. They state that the intention behind a knowledge hotspot is significant, and so is the use of tools of knowledge management.

The seven foundations of the regional knowledge economy, the intention of the area development and the five tools of knowledge management together constitute the Checklist Area Development in a Knowledge Economy. Together, they constitute an integrated framework that helps to assess the chances of success of a knowledge driven area development; it visualizes every relevant aspect in one single diagram.

foundations of the regional knowledge economy

Regions and cities are eager to thrive in the knowledge economy. They seek to attract and promote innovative activities, for example through cluster policies. Particularly since the widely read books of Richard Florida ('The Rise of the Creative Class' and 'The Flight of the Creative Class') the awareness has grown that attracting talent – mainly highly educated people – is essential. But what actually determines the success of cities and regions in the knowledge economy? Van Winden et al (2004) uses the metaphor of the knowledge house, which rests on a foundation consisting of seven aspects: the knowledge base, the economic base, accessibility, the quality of life, diversity, scale and social equity in the regional economy.

The first foundation is the regional knowledge base. It consists of knowledge which is embedded in the knowledge infrastructure, such as knowledge- and educational establishments and research institutes. A strong knowledge base evidently makes it easier to attract talent. Not only permanent staff, but also people who visit the region temporarily to make use of this knowledge base, or contribute to it (like foreign students, PhD's, guest lecturers, project workers). A strong knowledge base helps to create local buzz and generate start-up companies (like for example in Oxford, Cambridge or Leuven), and fosters renewal in the business sector and beyond.

The second foundation –setting the margin for any hotspot development- is the economic base. What's the structure of the economy? Which economic sectors are dominant? What type of businesses are operating in the region? Is there venture capital available? The economic base is determining the type of jobs the region offers and strongly secures the attractivity for talent and innovative projects. The economic base of a region only gradually changes, but sometimes international developments have a deep and prolonged impact.

The third foundation is the quality of life: the quality of residential facilities, nature and green, cultural amenities, care and the grade of urbanity. This factor is key in attracting and nourishing talent. Employees nowadays don't merely look at the primary and secondary working conditions their employer offers; Increasingly the quality of life is a determining factor in their location decisions.

The fourth foundation is accessibility. How accessible is the region, nationally as well as internationally? Is there an airport and/or high speed train connection? Accessibility remains a key location factor, not only for internationally oriented knowledge industries – which more and more operate within international networks – but throughout the entire economy. The rise and growth of the network- and project economy makes accessibility even more important. Increased accessibility implies that:
- Companies are not exclusively dependent on the regional labour market, but can also hire talent from nearby cities, which raises the attractiveness of a region as business location;
- Companies can easily perform assignments for clients beyond the region, and can operate more effectively within the network economy. It's easier to cooperate in projects with companies from other parts of the country or beyond;
- Students and researchers can attend courses or perform surveys more easily at other knowledge institutes within the region.

The fifth foundation is diversity. In which sense can a region be called economically and culturally diverse? Research shows that diversity is a key component for innovation. Newcomers and (temporary) knowledge workers commonly feel more at ease in a culturally diverse and varied surrounding. But diversity is hard to create. It arises spontaneously, or not. But there are leads. It's possible to facilitate meeting places or stimulate certain 'communities of practice'.

The sixth foundation is scale. A certain scale is necessary to support high-end facilities, like an international school or specific cultural amenities. These facilities are important for attracting and nourishing talent. But also the scale of the regional labour market is relevant. In the present-day knowledge economy, both partners often work and change companies more often. In choosing their residence, knowledge workers estimate their options to change employment without having to move. Scale therefore is not about the size of an individual city, but more about the attainability of labour within the region. Investments in good connections between cores in a region can support the creation of a certain critical mass.

The last foundation is social equity. Are there (big) differences in equality between population groups and does this lead to tensions? If so, it can damage the image of a region, with severe consequences for it's attractiveness. A high amount of inequality can also lead to unsafety, while in a sense it also implies a waste of human capital. Also the social equity in a region only changes very gradually.

intention of area development

The development of knowledge hotspots can be a means to strengthen the regional knowledge economy. In determining the potential, the intention of a development is important. What's the main idea, or key purpose of the concept? Who takes the initiative? Which party is leading? In what way is the original goal persevered? Some area development concepts are inspired on political goals, or by the policy to enhance the economic spin-off from universities. Other concepts are more business-driven, with the ultimate goal to increase innovation and profitability for a company. The intention and rationale of an area development plays an important role in its quality and added value.

The development of a knowledge park is strongly contingent upon the roles and incentives of the actors involved (like university, companies and municipality). Area developments which are mainly driven by the public sector or university generally have more difficulty in maintaining focus and defining clear strategies for the area-based concept. The number of actors involved is higher, decision making is more blurry, and whimsical political considerations play a role. A business driven intention scores better in these respects. Choices are made on the basis of business considerations rather than political processes. It also helps when one dominant private actor takes the lead, in particular when it has good working relations with regional authorities and other external actors.

five tools of knowledge management

The added value of a knowledge driven area development ultimately lies in the effects of co-location of related companies and knowledge institutes, and knowledge exchange between them. Van de Klundert and Van Winden (2008) focus on these advantages, and identify five tools for knowledge management: optimizing cognitive distance, management of co-opetition, organisation of spill-overs, and the active and passive promotion of knowledge diffusion.

The first tool is creating an optimal cognitive distance within the development. An optimal cognitive distance means that the coginitive 'gap' between people and companies is big enough to create new ideas, but small enough to retain the capacity of collaboration. Assuming that an optimal cognitive distance between park tenants is conducive to effective and fruitful knowledge diffusion, it becomes important to which extent measures can be taken to manage this factor. Is there an admission policy? Does the park focus on one sector or a 'community of practice'? Are zoning or cluster policies in place to co-locate similar types of business? Knowledge diffusion is enhanced if the park has a certain critical mass of tenants within fruitful cognitive distance from each other. Branding and zoning are proper instruments to manage an optimal cognitive distance. Branding is used in determining specific 'target groups' for the park, in order to generate a certain critical mass. It can be translated into very strict admission criteria for tenants to avoid the risk of losing focus and creating fragmentation. Apart from branding, zoning can be used to organize different functions and qualities within an area development scheme. The layout of concentric organisation is often based on a central position of shared facilities, surrounded by functions and amenities in a variety of appearances. The layout of poly-nuclear organisation is based on a diversified position of shared facilities, surrounded by functions within the same 'theme'. This 'physical clustering' of related activity is believed to enhance knowledge transfer through encounter.

The second tool is management of co-opetition. To what extent is pre-competitive co-operation and knowledge exchange between knowledge partners promoted? What measures are in place? Is there a policy to link stages in the value chain? And how is dealt with intellectual property? Knowledge parks are believed to be excellent 'catalysts' of pre-competitive co-operation between firms. In the inherent tension between co-operation and competition, the distinction between exploration and exploitation is a valuable tool in understanding the management of relational risks. This relational risks can be limited through area development

in two ways. On the one hand by concentrating on the exploration phase through segmenting on research and (a bit of) development. On the other by securing intellectual property though pro-active patenting.

The third tool is the organisation of spill-overs. To what extent does the park facilitate the creation of spin-off and spin-out firms from a mother company or university? It is believed that if 'mother and the child' are located at the same spot, knowledge synergies can be expected. There is a lot of interest in managing spill-overs by stimulating start-ups through incubator strategies. It is argued that spill-overs become undesirable from the point of view of corporations in the phase of exploitation. In that sense there seems to be a difference between management of university spin-offs and company spin-outs. Where company spin-outs are strongly related to development of an existing value chain, university spin-offs cover a far wider scope of interest.

The fourth tool is the active promotion of knowledge diffusion. To what extent are policies in place to enhance knowledge sharing and exchange in the park? A way to increase the possibility of innovation is simply to enhance encounters between people. Examples could be networking events, joint seminars, etc. Creating the right atmosphere for non-threatening casual encounters between people is crucial. Network management can promote these encounters, by organizing business meetings, conferences and gatherings. Network managers may actively seek to address the 'optimal cognitive distance' for example by bringing partners together on a specific topic.

The fifth tool is the passive promotion of knowledge diffusion. Knowledge exchange can be promoted in a passive way as well. For instance, the availability of common facilities (like cleanrooms or expensive machinery) may enhance contacts among people and firms, and lead to new forms of co-operation and exchange. Stimulating knowledge diffusion between organizations at a park can generate competitive advantages for tenants, but cannot be guaranteed through physical development only. Passive measures of knowledge diffusion (like facility sharing and zoning) is only 'the stage' for interaction. However, there seems to be a relation between intention, critical mass and the spatial concept of the campus.

The Digital Hub _ Dublin

In Dublin, the capital of Ireland, the 'Digital Hub' is being developed, since the year 2000. The Digital Hub is a dedicated cluster of ICT and new media firms. It is located in a distressed neighborhood, at the premises of the well-known Guinness-brewery.

Dublin is well positioned to build this knowledge cluster. The city has a strong knowledge base (several universities), and it is an attractive destination for foreign –mainly US- investment, thanks to the favorable tax climate, the English language, and the fact that Ireland is part of the Eurozone. Over the last decades, a strong ICT industry has developed in Dublin, though it was mainly based on back-office functions of multinational firms. In the last years, policymakers in Ireland and Dublin seek to promote innovation and the development of a 'home grown' knowledge industry. A key catalyst for the cluster's development was a major investment of the renowned MIT media lab –with hundreds of qualified staff- in Dublin. The government managed to win the Media Lab as an anchor tenant for the Digital Hub, and convinced the firm to locate there. A few years later, however, the Media Lab closed down. It had not managed to develop a sustainable business in Dublin. Evidently, this was a blow to the Digital Hub's development, but the policy makers decided to make a new start for the area and focus on smaller-scale development.

Over the last years, the brewery area has become a new face. The offices and buildings were upgraded and refurbished, and made ready to house ICT and media companies, thanks to contributions of the city and the national government. The ambition is to develop the area as a world-class knowledge cluster for ICT and new media firms. The Hub should become a symbol for Dublin's economic transition. Meanwhile, 84 companies have located in the Hub, among which big names like Google and France Telecom. In 2003, the state created a special development organization - de Digital Hub Development Agency (DHDA), to enable the redevelopment of the area. This organization acquired the land, and was assigned to develop a concept for the area and to make deals with private developers for the development of commercial functions (retail, housing). The severe economic crisis of the last years has made the latter very difficult.

The Digital Hub is located on the edge of Dublin's city centre, in a distressed neighborhood named The Liberties. This is a typical blue-collar working class

area for the workers of the Guinness brewery. Over the last decades, the Liberties area has been in decay. It has a high unemployment rate, educational levels are low, and crime rates are relatively high. The government did not want the Digital Hub to become an 'elitist island' in the middle of this area, and therefore took several measures to link the Hub with its surroundings. One of the ambitions has been to make the residents benefit from the hub as well. The idea to explicitly link the Hub with the Liberties area was elaborated in a consultation process with the main stakeholders. A 'Community-Public-Private-Partnership' (CPPP) was set up before the start of the development. Through this vehicle, residents could express their wishes and ideas. The CPPP developed a set of conditions and guidelines that to be applied in the development process that followed. Private developers commit themselves to comply with these guidelines.

All stakeholders signaled the importance of training and education as a link between the Digital Hub and the Liberties area. The Digital Hub Development Agency (DHDA) has signed agreements with 16 schools in the area, and a special agency was set up to elaborate the co-operation: The 'Diageo Liberties Learning Initiative' (DLLI). Diageo is the owner of the Guinness brewery, and still has strong ties to the brewery and the surrounding neighborhood. It funds the training and educational programmes, and co-funded the rollout of state-of-the-art ICT facilities at schools in the Liberties area. In these schools, the DHDA provides training sessions on ICT and new media, typically in co-operation with tenants of the Digital Hub. Moreover, it organizes excursions for schoolchildren to the Hub, and during holiday breaks, it offers all kinds of workshops, for example on making rap songs using digital technologies. For older students, there are courses about how to start a business. The programme appears to be a success; a recent study shows children in the Liberties area are relatively good at using computers and digital techniques.
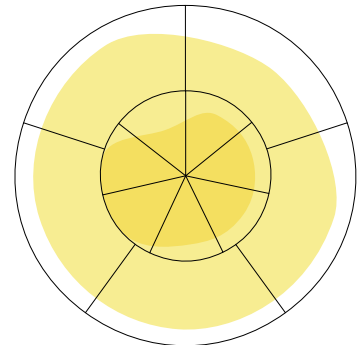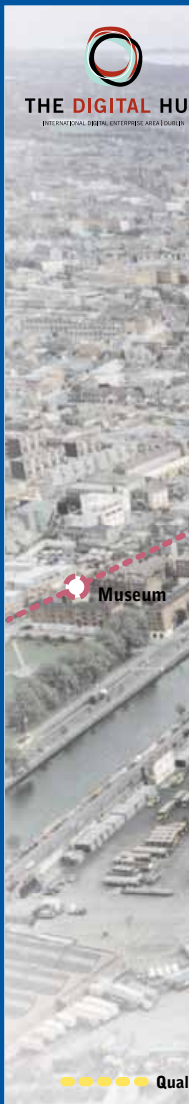
THE DIGITAL HUB: CITY CONTEXT

N E S W

B

Dublin Docklands Development

International Financial Services Centre

O'Connell Street

Temple Bar

Christchurch Cathedral

St. Stephen's Green

Smithfield

Four Courts

James Joyce Bridge

THE DIGITAL HUB

THOMAS STREET

Guinness Storehouse

St. Patrick's Tower

ity Bus Corridor

Arabianranta _ Helsinki

Arabianranta is a redeveloped industrial area in the North-western part of Helsinki, Finland's capital.
Since the mid-1990s, the area has been redeveloped into a mixed district including leisure and housing functions but also offices, business premises and education. The area has one central theme: Art&Design, and this theme has consistently guided the redevelopment over the last two decades. The success of Arabianranta has attracted the attention of urban planners all over the world.

For long, the industrial area was dominated by a porcelain factory Arabia, once one of the largest of its kind in Europe. Decline set in during the second halve of the 20th century. Factories closed down, and the area became a polluted wasteland.
In the early 1990s, a plan was developed to regenerate the area. In that period, Finland went through a severe economic crisis. The government searched for new growth opportunities, and design was chosen as focal theme for the redevelopment. This theme related to the history of the area: The Arabia company had always been known for its excellent design. Moreover, Helsinki's world-class art&design academy had opened a temporary facility in an abandoned building in the area, and a small number of design firms were already located there.

Since 1995, the area is being redeveloped and managed by a dedicated development organisation ADC – Art and Design City Helsinki.
It is owned by the main stakeholders, among which the City of Helsinki, the design academy, some larger design firms, and knowledge institutes. Together, they develop and implement the strategy for the area.
Over the years, strong investments were made in art in public spaces, and requirements for the design quality of buildings were set exceptionally high. Moreover, each building is equipped with state-of-the-art broadband infrastructure, which made the area an interesting 'playground' for innovating firms to develop and test new products and services. Nowadays, the area is a frontrunner in 'user-driven innovation' in which resident communities are involved in innovations. ADC plays a role as initiator and network broker for new projects.

ADC formulated the ambition to turn Arabianranta into the leading centre of art and design in the Baltic region, through the 'quadruple helix' approach: strategic partnerships between firms, public organisations, knowledge institutes and citizens.

By now, the area counts five institutes of higher education, a large number of renowned creative design firms, (among which many foreign), a mix of higher class residential areas and social housing, and high quality amenities. It currently counts some 10,000 residents –it is very popular- , 5,000 students, and 300 creative firms employing 4,000 people.

Companies indicate that they like the area for its creative ambiance; moreover, they highly value the presence of the design academy. The area has gained a strong reputation as 'the place to be' for design firms. According to some entrepreneurs, being located in Arabianranta helps to sell products to business clients, and also makes it easier to find qualified staff. Many firms are located there to stay at current with the latest design trends. For them, this 'buzz' aspect is more important than possibilities for networking and commercial co-operation.
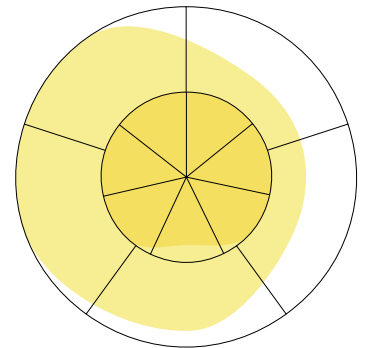
Wissenschaftshafen _ Magdeburg

The German city of Magdeburg counts some 230,000 inhabitants. It is the capital of the State of Saxony-Anhalt. Since the German unification in 1990, many young people have left the city, and for years, the city faces a population decline. In GDR times, the urban economy thrived on a strong machine building industry, but after the 'Wende' this industry went into decline. The city has a university (named after Otto-von-Guericke, who discovered the Magdeburger Halfspheres) and a polytechnical school. The economy of the city is vulnerable. Young higher skilled people tend to prefer the big cities in Germany, and the educational levels of the workforce are relatively low; there is no strong knowledge industry in the city. Moreover, the city lacks an old city centre (it was heavily damaged during WWII), and it does not offer many high-quality urban residential areas for the better-off, which makes it difficult for the city to attract talent. The city is located at a central location in Germany, but international connectivity is rather weak, which is a disadvantage in a globalizing world.

The city's main strong points are its university and polytechnic school, and also two key knowledge institutes: the Max Planck and the Frauenhofer institutes. It is the ambition of the city to benefit more from these assets in economic terms. In this connection, the city is redeveloping an old inland port area that is no longer in use as a port. Since 2001, this area is being redeveloped as a 'science port'. Some old warehouses are turned into 'knowledge factories' housing knowledge intensive firms, and new premises were built as well. In the last few years, some research institutes have opened establishments in the area (Max Planck, Frauenhofer), as well as a number of smaller firms. In the future, the area is to become an attractive mixed area (living, working, leisure) for scientists and knowledge workers. The situation of the area along the river Elbe gives it a strong basic quality, and opens opportunities to combine a knowledge campus with leisure activities. Recently a restaurant was opened, where employees and visitors can enjoy their lunch or dinner with a view to the Elbe. So far, no explicit 'knowledge management tools' are applied in the area. There are interfirm networks, but they evolve in a rather ad-hoc manner.

The new Science Port lies next to university campus, so in principle, the two can merge into one single knowledge quarter. In practice, however, it proves not easy to connect both areas physically and functionally. For one thing, a busy road separates the two areas from each other. For another, the university is mainly concerned with its own campus area, and there is little strategic co-operation with the developers of the science port next door (similar problems occur in many other European cities). Recently, an urban plan is being designed to at least physically integrate the two areas.

Magdeburg's strategy is to integrate the new knowledge cluster in the city, not only physically but also in social respects. Citizens should know what's happening in the area, they should recognize it as a new economic pillar of their city. Also, the area should be attractive, not only for scientists but for all Magdeburg's citizens. The city takes several measures to achieve this. Among other things, each year it organises the 'long night of science', during which labs and knowledge institutes open to the public; there are all kinds of workshops, exhibitions and shows related to innovation and science. The event is very popular, drawing thousands of visitors. It clearly signals that knowledge and science need not be something abstract and obscure, but can lead to interesting new products that make sense in daily life; also it reflects hopes for a new economic future of the city.
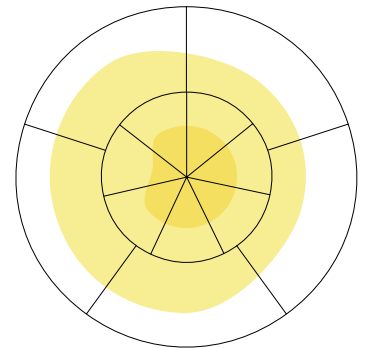
High Tech Campus _ Eindhoven

The High Tech Campus is a knowledge park for open innovation situated at the edge of Eindhoven, south of the city centre. It covers approximately 103 hectares and is adjacent to the highway A2 with a direct turnoff into the area. It is well reached by car, public transport and by bike. At approximately 15 kilometres there's Eindhoven Airport. The Eindhoven University of Technology is situated within 6 kilometres.

Parts of the area were already in use as a business area before it was transformed into a campus. The first phases of development are finished and about 174.000 m^2 of floorspace has been built or revitalized and is in use. At the moment approximately 5.300 people are working on the campus of an estimated ultimate population of 8.000 to 9.000 people. Fully realised, the total amount of floorspace will add up to 283.000 m^2, which creates an average density of build space ('fsi' = 2,75). The functional program consists of 8.000 m^2 cleanrooms, 50.000 m^2 laboratories, 100.000 m^2 office space, 125.000 m^2 of additional development space and 10.000 m^2 of collective spaces in 'The Strip'. The investments in the area based development cover approximately 506 million euro.

The knowledge foundations of the Eindhoven region are strong: the regional economy is dominated by high-tech business, and there is a renowned technical university. Approximately 50% of the total Dutch expenses on research and development happens in this region, in which Royal Philips takes a large share. The economic base is strong, but specialized in high tech manufacturing and therefore vulnerable. Quality of life in the region can be seen as average, while accessibility is troublesome: the city has no big international airport nor connection to HST systems. The urban diversity of the region is average, partially related to the limited scale. An advantage though is, that there's generally a positive atmosphere of collaboration. Key actors know each other well, and in a mutual solidarity there's readiness to stimulate initiatives.

The High Tech Campus is a private development, initiated by Royal Philips Electronics as the owner of the property. The Philips Research division is one of the mayor tenants (1.800 employees and 125.000 m^2 floorspace) and the 'launching costumer'. Philips Research has much influence on the development and plays an active role as 'enabler' for open innovation. Other anchor tenants like NXP semi-conductors (2.500 employees and 46.000 m^2 floorspace) or Atos

Origin profit of this vision. Although creating real estate value is certainly a feature in the development, the primary choices are business driven. Therefore the development keeps a very strong focus on knowledge diffusion.

An important goal of the High Tech Campus is creating an environment for open innovation. Culture and facilities on the campus connect to the quest for boundaries of knowledge, within the framework of commercial use. Collaboration, seen as formal innovation networks and informal value chains, is integrally connected to these goals, as well as healthy competition and mutual trust. In open innovation, stimulating knowledge transfer is essential. Seeking for synergy between people involved in research and development is an important asset, as well as shortening the 'time to market'.

The concept of the High Tech Campus can be characterized as an area based campus development where a network of meeting places on different levels is created. Open, transparent buildings as well as centralized amenities are organized as pavilions in a continuous landscape with many opportunities for social activities, sports and recreation.

The High Tech Campus has a selective acquisition/admission strategy, which defines three types of potential tenants. So-called 'Triple-A-Tenants' (for which the brand of the location is an important location-factor), small tenants (for which the accessibility of external, specialized facilities is an important location-factor) and techno-starters (for which the entrepreneurial advantages are an important location-factor). All potential tenants have to be R&D intensive organizations, which are related to (one of) the five main technological domains on the campus: microsystems, life-tech, high-tech systems, infotainment and embedded systems. Admission of end-users is an integral decision by the campus management, which strongly relates to the concept-value of the park and the mix of users as a whole. The position of the different types of end-users within the campus lay-out is related to their primary location demands (i.e. sight, quality, scale and costs).

Management of co-opetition is organised by focussing on company segments within the exploration process. Company divisions and organisations on the High Tech Campus are mainly concerned with basic research. The only division which is close to production (and the process of exploitation) is Philips Applied

Technologies, which 'translates' innovative ideas into production solutions. Most of the work on the campus is limited to the pre-competitive phase.

Also, there is a keen and quick process of knowledge validation. On the one hand the 'Technology Liaisons Office' maintains close contact with tenants and creates potentially valuable connections between them. On the other the 'Intellectual Property & Standards-office' is permanently patenting innovations.

The campus organisation pays attention to company spin-outs and external start-ups in several ways. There's a special fund for new technological entrepreneurs named Technostar. Apart from financial means, the management of this fund helps start-ups with their company development, networking and coaching. In the past three years fifteen spin-outs have started. In a physical sense the start-ups are accommodated through a technology- and business accelerator: a multi-tenant building with reduced rents and dedicated spaces.

The earlier mentioned Technology Liaisons Office functions as an intermediary for technology sharing and the management of spill-overs between tenants. It organises workshops, business meetings and network happenings to enhance knowledge diffusion. It has also initiated the 'Campus Technology Liaisons Club', which is a network organisation of decision-makers and 'influencials' on the campus. The office essentially tries to build and maintain a community of practice. "In the end the purpose of this community is, to have the feeling you work on the campus instead of with an individual company".

To promote knowledge diffusion, a series of specific physical measures are taken. The spatial organisation of the campus is dominated by the centralized position of collectively used facilities with a concentric zoning of different functions around it. In the heart of the campus, collective functions (like a restaurant, shops and meeting rooms) are organized in one building called 'The Strip'. Next door, there are shared facilities like 'MiPlaza', 'The Holst Centre' and the 'Centre for Molecular Medicine': buildings containing clean rooms, laboratories and specialized spaces. More toward the edges of the campus, there are a several collective parking buildings in between buildings with mixed functions and users. In the periphery the facilities for sports, children's day-care and the technology- and business accelerator are situated. Related to highway A2 the 'Triple-A-Tenants' are concentrated. The maximum walking distance

between the centralized shared facilities and other functions on the campus is approximately 8 minutes.

The interior zone is inaccessible by car and the quality of the unbuilt space is high (landscaped). Employees and visitors are encouraged to walk to their destinations on the campus, enlarging the chance of casual encounters in a nice environment. Within the individual buildings there are no meeting rooms allowed beyond 8 persons. Instead, these facilities are collectively offered within 'The Strip'. It's also not allowed to have lunchrooms or café's within the individual buildings. Again, these are offered collectively. Even the collective sporting facilities focus on team sports, in favour of individual workouts.

The High Tech Campus is generally considered to be an excellent example of an area based development for a working environment in the knowledge economy. Especially the strong focus on concept value and the involvement in development on the highest management level of key tenants are crucial in this respect. Noticeable are the good relationship with authorities and external actors.

Real weaknesses are not mentioned, although there are two main points of attention related to the purpose of this survey. Firstly the project sometimes tends to become too real estate driven, when striving for additional property value instead of creating value for companies on the campus. Secondary the open innovation concept would be really complete, if apart from the two anchor tenants (Philips and NXP) a third substantial corporation would concentrate R&D on the campus.
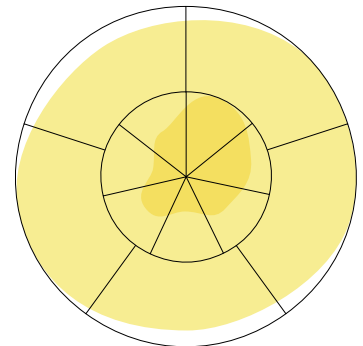
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