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Managing the ecosystem

Parallel Session 5
"Key elements of next generation STPs and AOIs"

Author:
Jacques van Dinteren (zjak.consult@gmail.com)
Zjak Consult / IADP, The Netherlands

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Management Summary

While the emphasis early on was on the physical development, along the way developers started realising that science and technology parks (STPs) require an entirely different approach. This paper starts with presenting an overview of the development of the STP-concept and the impact of management on the success of these parks. In The Netherlands that success is to a certain extent often hampered by the fact that several parties are involved, having their own responsibilities. A simple model is described in which daily management can have control over the socio-economic and the physical aspects. This model can also be used for co-innovation parks and the upcoming concept of innovation districts (all together: innovation areas). In the last part it is stated that changing concepts have led to changes in management and this evolution will continue due to, among others, globalisation.

The innovation area as an umbrella

The 'science park' is a phenomenon of increasing relevance to modern urban planning (Christiaanse, 2007). In Europe, universities are reconsidering their position in society and taking on extensive reorganisations and expansions of their physical structures. The post-war university campus as an isolated community of scholars is subject to thorough revision. In Asia, on the other hand, new campus-style universities are shooting up like mushrooms. Global companies build campus-style factory sites for their international headquarters or for their research-and-development departments.

Given the nature of the activities and the institutions a science or technology park (STP) focuses on, it should not be considered likely that this would be a static concept. Companies and institutions that are focussed on innovation generally are highly dynamic. Nevertheless, in the first decades of its existence the STP-concept was predominantly viewed as a 'stand-alone' activity and often primarily as a real estate development. In western economies this has significantly changed over the last three decades and the primary focus has shifted to stimulating innovation. That is a first trend.

A second trend is the broadening of the concept. When it is about specific locations for innovations it is no longer about STPs alone. (Industrial) co-innovation parks, developed around a leading innovative company instead of a university, were created when these companies opened up their sites for other companies and institutions.

A relatively new concept is the innovation district which can be defined as "a designated zone with its own specific management team, whose main objectives include economic development via the promotion and attraction of selective innovative business for which specific services are provided or made available, and that may also include residential and cultural zones or facilities, or be embedded in urban spaces having such facilities, and with which the economic aspects of the area of innovation interact" (Sanz, 2016). In fact Sanz and others (Nilina c.s., 2016) use the term "innovation area". The scale of such an area can vary widely. Ann Arbor SPARK (U.S.A.) covers an entire region, while 22@Barcelona is 200 ha. In our opinion all the more reason to distinguish between innovative regions and innovation districts which, in terms of scale, are comparable to co-innovation parks and science parks. We suggest to use the concept of an "***innovation area***" as the umbrella term for science parks, industrial co-innovation parks and innovation districts. On a higher geographical scale one can distinguish the "innovation region".

The shifting away from a real estate development towards stimulating innovation has changed the management of these sites. It is not about managing buildings, but managing a community of people working on innovations. Due to its character managing an innovation district might be somewhat different from managing a STP or an co-innovation park. The management of such a development is still important, though functional blending of activities is a relatively new element in this concept and might ask for a somewhat different approach. Due to the functional mix other parties than the usual ones might become involved, such as the inhabitants of the area. Moreover, the link with a university is generally less strong, though this can be partially overcome by establishing a 'branch'.

The above demonstrates that there are alterations in the concept over time and this has led to changes in the way these estates are managed. Such modifications will continue, for example due to the rather isolated geographical position of many STPs, often at the edge of a city. That poses questions about the embeddedness of STPs (and probably also co-innovation parks) in the region. May be the region is a better scale: an innovation region with multiple focal points (innovation areas) and a network of companies and institutions which are located in those innovation areas and elsewhere in the region. That poses questions about the way innovation areas and their linkages with the region are organised. It also raises the question whether management at the regional level is needed. And in a next step one has even to consider the global level. Thanks to travel options, telecommunications and the like, regions are included in worldwide networks through the process of globalisation and innovation parks become hubs in global knowledge network.

This paper will discuss some of these changes, using a simplified model of changing innovation area concepts and changing management activities.

Changing concepts, changing management

Figure 1 sketches the development of the innovation area concept over the past decades, also showing the emergence of innovation districts and the growing interest of embedding these concepts in regional and worldwide networks. It is an ideal-type image which will rarely apply to a specific innovation area. The figure mainly shows that currently much more emphasis is placed on networks and (therefore also) on the regional and worldwide embedding of an innovation area. The more complex these networks are, which is also related to the geographical scale, the more important the management of the ecosystem.

There are many ways to manage a company and there are also many ways to run an innovation area. When analysing management concepts, ownership is an important starting point. A survey of IASP in 2012 (European Commission, 2013; refer to figure 2) shows that the public sector dominates: 55% of STPs in Europe are owned by public parties, mainly local government, public universities and regional government. This can be a mix of public parties. 15% of the STPs are privately owned (private universities and foundations, and private companies) and 31% of the STPs have a mixed ownership. In this latter case local government, public universities and private companies dominate.

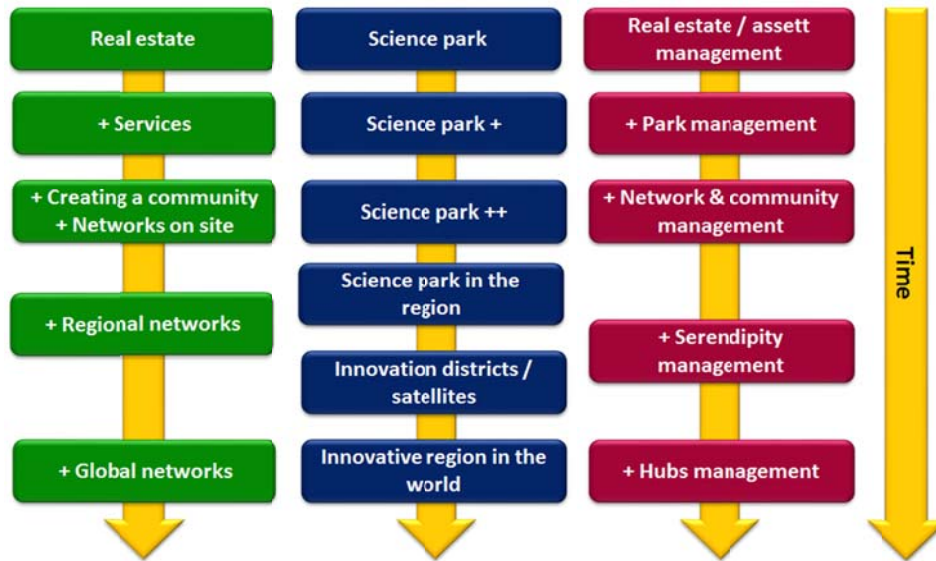*Figure 1: Ideal-type development of the innovation area concept and its management*
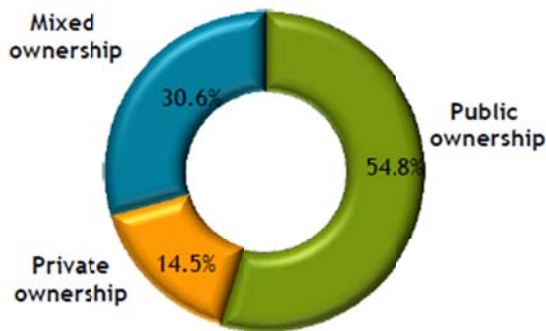

Figure 2: Ownership of STPs in Europe (source: European Commission, 2013)

The above mentioned survey by IASP relates ownership to land, sites, infrastructures and buildings. If perceived in such a way managing a STP doesn't differ from managing an industrial estate or a business park. This focus on the physical aspects of a STP was typical for the first decades of the STP concept, as stated earlier. In that stage the typical characteristic of a STP was a physical clustering of a certain target group, in this case a group of companies focussing on research and development. During the years the insight grew that the real economic asset of a STP is in the linkages between companies, institutions and a university. The conclusion was that successful STP management needed an extra layer. Management of a commercial estate will focus on infrastructure underground and the surface and will take care of buildings and the built environment figure 3). But the added value of an innovation area is in the 'software' as an extra layer. That distinguishes it from a regular industrial site or business park:

- management of the networks between companies, institutions and a university;
- management of the facilities for companies, institutions and a university;
- management of the services for the community (the people who work on the site).

Figure 3: physical and socio-economic layers as individual and interconnected components of an innovation area

The right section of figure 1 shows the manner in which the management of innovation area concepts has adapted to evolving concepts and the shift from real estate towards the community (to put it briefly). Today many STPs in the western world are 'halfway', although many differences exist between countries and regions. There is a focus on creating networks between the parties in the estate and management also takes care of a high quality environment for the employees to sustain creative processes and to attract and keep a critical and highly educated workforce, the community. When looking at creating the community joint festivities, sports events and having a drink together should help to develop this. Part of this is also the quality of the working environment. Two third of the managers in Dutch science parks stated that due to the scarcity of highly educated personnel a sublime working environment is essential. Although it isn't a science park, but much more a cluster of media companies, Chiswick Park in London is still one of the most striking examples of creating such a work environment. Although building a community is perceived today as an essential part of an innovation part, the most crucial is creating the networks between companies and institutions. Match making, organising seminars, support with patent applications are all matters which are part of the extensive service package which innovation area management offers.

So, today, there are many different management activities: area and real estate management, network and community management, but also facility management, asset management, etc. All these management activities generally have different stakeholders. This can cause problems. How can these different fields become properly connected and organised in a coherent way? Is it possible to have one organisation that can do business on behalf of all partners? If there is only one owner managing a STP is (relatively) easier, of course. In The Netherlands that is case with the High Tech Campus in Eindhoven. Other STP's show a somewhat more complex organisation.

Managing STPs in The Netherlands

Although there are many differences one can generally state that many of the Dutch STPs now are in the stage of further developing the community and building networks. The question who manages the STP is relevant here, because in general there are two or more stakeholders. The exception is the *High Tech Campus in Eindhoven*. Starting point for the Philips High Tech Campus were the high quality laboratories of Philips (NatLab), the trend towards open innovation and the feeling by management that the company had to stimulate the regional economy. This latter aspect had to with the decision by Philips to move their

headquarter from Eindhoven to Amsterdam in 1998. In a discussion with government the idea of an open innovation park came up to compensate for the loss (although only 300 jobs were involved). Initially the park was managed by Philips, but in 2008 Philips decided to sell the campus to focus on their core business. In January 2012 Philips established High Tech Campus Eindhoven Site Management B.V. (without the name Philips). This organisation takes care of daily management, including marketing and promotion. In that year a Dutch investor Chalet Group) bought the campus and today all management activities are still in one hand. However some specific and unique facilities are still owned and managed by Philips.

New tenants in HTCE get two types of contracts with two organisations affiliated to Chalet Group: a Service Level Agreement (SLA) with HTCE Site Management and a Lease Contract with Calittum HTCE for rent and parking space. The first one overs three types of services: collective obligatory services that are site related (e.g. energy, ICT, infrastructure, etc.); collective optional services if needed; and optional services that are free choice and taken via HTCE Site Management (Curvelo Magdaniel, 2016).

TU Delft Science Park once started in 2005 as a predominantly real estate project by property developers Bouwfonds MAB and ING Real Estate: Technopolis Innovation Park (120 ha). University and municipality took care of the financial aspects of the land development, including the financial risks. The developers took care of the master plan and the investments needed, would buy the land from the owners and develop the buildings. All parties worked together in a project organisation, but due to the lack of expertise in the development companies the project failed and the university took over. The exclusive cooperation agreement between the landowners of Technopolis and ING Vastgoed and MAB / Bouwfonds was disbanded. Today the university has the lead and is looking for the best form to manage the development. The university also offers space for companies in their own buildings. Municipality and university work together on the marketing of the science park in 'Delft Technology Partners'.

So far for the involvement of real estate companies. One being successful, but another wasn't. In the Netherlands property developers are reluctant and if a developer is interested the question often is how to convince investors. It is a niche market and if developers or investors doesn't feel comfortable, projects will not start. Even when it is only about buildings it is sometimes difficult to get the project going. Specialisation, however, helps as is shown by the successful developments of Kadans Science Partner. A very interesting aspect is that this developer / investor combines a real estate development with the management of the building, as the building remains in the portfolio of Kadans. Kadans provides a total package of services, including work space facilities, coaching, advice, financing and access to its network.

To stimulate investments and to make investments easier to get, the Netherlands Investment Institution (NLII) is now organising a fund for science parks and R&D related real estate. Pension funds and insurers can invest directly in this fund.

In the case of the *Amsterdam Science Park* the estate is owned by municipality and university together, however it is a patchwork of ownership. The estate of the Dutch Scientific Organisation (NWO) covers the northern part of the science park and has its own park management. Municipality and university sell the available land for the same price. Both took care of the urban master plan, which is supervised by the municipality.

The construction zones are subject to a building code that is characterized by a continuous and varied network structure that establishes a system of successive public and semi-public spaces. Situating communal amenities at junctions fosters concentrations of public activity. Instead of standing like isolated jewels in the landscape, the buildings 'fold' themselves around the courtyards and interweave with adjacent buildings. In this way, interactivity, knowledge exchange and cooperation among the companies in the area is stimulated.

This creates a base for successful social and economic interaction through stimulating a 'xenogamy' of various talents, ideas and insights.

Companies that want to establish on the park go to the central organisation which takes care of the first contact. Contracts are handled by the land owners and the municipality checks if the company fits into the profile as described in the spatial plan. Daily management is carried out by the Science and Business Organization of Amsterdam Science Park. This is the central and joint organization of the three founding partners, which are the city of Amsterdam, University of Amsterdam and NWO. These three are in the board of directors and are joint by four other representatives of companies and institutions on the park. The main goal of the S&B organisation is to connect entrepreneurship, education and research and to connect Amsterdam Science Park with its external partners. The main focus points of the management organisation are:
- acquisition & retention;
- valorisation & entrepreneurship;
- corporate communication;
- functions & facilities;
- internal & external relations.

It all works well together, but it is said that an improvement can be achieved if the land is in one hand and competences are concentrated, both preferably within the existing management organisation.

The same ideas can be heard in **Utrecht Science Park**. Stakeholders are the Utrecht University, the academic hospital and the Hogeschool Utrecht (College). Provincial and local government is also involved but not an owner of building or land. Daily management is carried out by Foundation Utrecht Science Park.
Several parties own the land. That includes parking spaces, but the fares for parking are not synchronised. Interested companies and institutions can have a site on basis of a land lease. Available land is sold by the university, but in general interested parties start the discussion with the foundation.
In a project carried out in 2016 the joint conclusion was that too many parties were involved in too many aspects of the science park. The ambition is to get a slim and flexible organisation, which will be the existing foundation. The question is, however, which tasks can be handed over, under what conditions (mandate). The joint ambition is
- a common vision regarding the development of the science park (urban development, economic impact, target groups, growth strategy, etc.);
- joint park management;
- joint mobility management;
- joint parking management;
- cooperation in offering services to the community;
- marketing and acquisition of the target group, including a strict admission policy.
In the vision attention has to be paid to the question how costs, profits and risks can be distributed among the stakeholders. Whatever the organisation, the stakeholders are all customers of the daily organisation (the existing foundation). A stakeholder analysis it is determined to find out which stakeholders are involved and the degree of the influence they can get.
With regard to the area development each party retains his responsibilities as currently laid down. Joining forces in this field will be discussed in a later stage.

Looking at Utrecht and Amsterdam it is clear that there is a feeling that governance of a science park should be organised in such a way that all relevant tasks are carried out by one central organisation. This can be heard in several other places in The Netherlands. Managers involved are very much interested in (rather) simple organisations as have been set up for Oxford Science Park or Surrey Science Park in the United Kingdom. So, during a project for Utrecht Science Park the question rose: what can be a rather general governance model that takes every stakeholder seriously, but makes one central, coordinating management office possible? How to optimise governance?

Optimalisation of governance

Starting point is that in today's innovation areas the development of a knowledge network of companies and institutions is essential (including facilities). The same goes for the creation of a community (which is more focussed on personnel, offering services and a top working environment). All together: the ecosystem. Of course one needs also an attractive area and buildings that suit the needs of companies and institutions that are focussed on innovations. This leads to following simple way of reasoning: development strategy → ecosystem → physical development. It cannot be denied that first of all the 'guests' in the estate (companies, institutions, university, leading innovative company, others) are central. This leads to the scheme presented in figure 4.

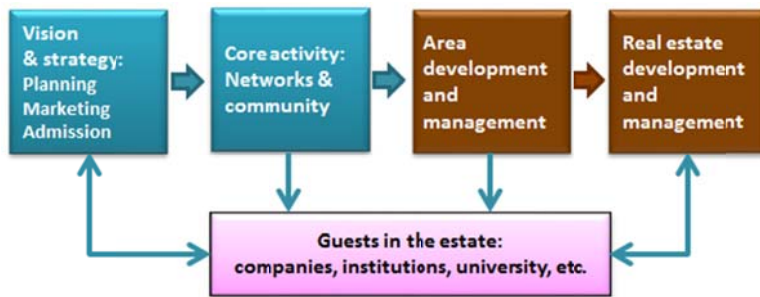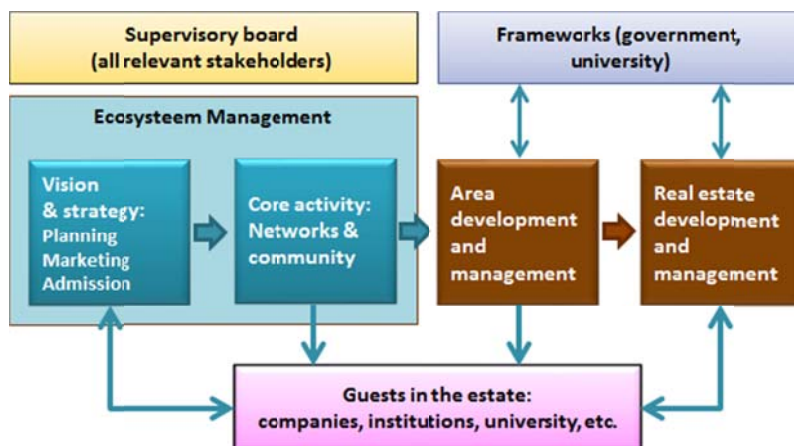*Figure 4: in search for a governance structure – starting position*


Figure 5: The extended scheme

The scheme makes a distinction between the social-economic system (blue) and the physical, spatial system (brown) which creates the conditions for the social-economic system. The two main activities in the social-economic system will be carried out by one organisation, taking care of daily management and strategies and is controlled by a supervising council in which all relevant stakeholders are represented. That includes the stakeholders responsible for the area and the buildings. Now we have to add government. First of all because the plans have to fit into the legal plans of (local) government. Also the university, for example, will have its own policy that can be relevant for the development. Now we have a model that is recognisable in several science parks in The Netherlands (figure 5).

Problem is, however, that daily management has no direct control over the physical environment. In many of the Dutch cases this doesn't hamper the functioning of daily management, although it is often said that it makes a coordinated management of the estate less easier and asks for more coordination than would be necessary. Therefore, the next step in the model is to give the ecosystem management organisation the mandate to take care of the area and real estate management Figure 6). To complete the picture we can add the linkages between the central management organisation and external parties that offer financial solutions, which are of great importance for the companies and institutions working in the innovation area. Stakeholders in the Utrecht Science Park are now together exploring the possibilities for such a model.

Figure 6: Final scheme
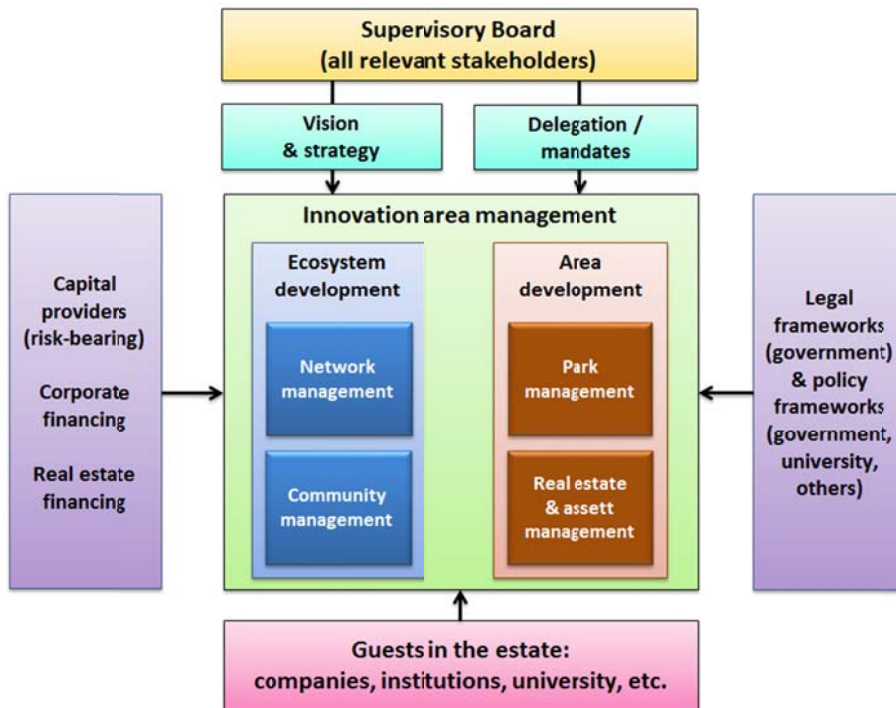
New themes in management

The ideas about managing an innovation area have changed over the years. It would be simple to think that it would stop here. New developments are coming up, like serendipity management or changing the introvert character of STPs and co-innovation parks and making these estates focal points in a regional network.

Serendipity management

A new element in managing the networks of an innovation area is creating or stimulating serendipity. Essentially serendipity management comes down to: how can people with different backgrounds be connected and collaborate, to enable new insights and ultimately new products to be developed through "pure coincidence" (= serendipity)? This may manifest itself in a building in which the concept resembles all kinds of creative work places which are popping up all over the place in which flexible, playfully designed spaces with all kinds of facilities and short lease periods are available for creative people, entrepreneurs and others. An example of this in a science park is the NetWork Oasis at the Joensuu Science Park (Finland). This concept will only become truly interesting when the idea of serendipity is combined with a method in which different researchers and product developers with different characters and backgrounds are brought together. This is done via a step-by-step process including training camps and work sessions to build teams, which will then focus on the development of a new product (see Kakko, 2013). This has consequences for the management method, as shown in the table below. Not that this will make project management obsolete. The schedule shows that by including networking, and particularly from the perspective of serendipity, other skills are required from managers and involved parties.

Table 1: Difference between project management and management of serendipity (Kakko, 2013)

Characteristic	Project management	Serendipity management
Approach	Project	Journey / exploration
Type of innovation	Directional	Intersectional
Organisation	Fixed in the beginning	Flexible
Focus	Effective process	Best possible result
Structure	Closed innovation	Open innovation
Mission	Goal decided in the beginning	Vision decided in the beginning
Competence search	While defining the project	Training camp approach
Resources, time schedule	Fixed	Flexible
Management style	Command and control	Connectivity and collaboration

Regional embeddedness

A STP can only develop and be successful if it is situated in an innovative region. So, it is logical that a STP, but also other innovation areas, is well connected with its region. An innovation area needs regional embeddedness. An innovation area, in fact, is nothing more than a spatial cluster of R&D related activities within an innovative region. And even than: what is a region when we are talking about innovation? The best innovation areas are or are becoming hubs in large, global networks, thanks to enhanced telecommunication and travel options.

Linkages in the regional network can be established by companies and institutions. Part of the game can be the creation of satellites by an innovation area. As an innovation area has reached the limits of its growth, occasionally "branches" are developed in other parts of the region. One out of three members of IASP already has one or more branches. In The Netherlands none of the innovation areas have branches. In 2016 the Utrecht Science Park was the first one to think about establishing satellites because the park itself is almost fully occupied. A project has been carried out to find out what the best locations are. Two branch types were distinguished:
– development cluster: applied R&D and development of products based on the results of basic research;
– testing cluster: laboratories, pilot plants and the like.

After a first selection of 37 locations, 11 were investigated in more detail. 14 variables, grouped in three main dimensions, were used to test the suitability of these possible satellites:
– (spatial) quality of the location and companies present (availability of sites and buildings, representability of the buildings, availability of services, quality of public space, other companies present);
– reachability (travel time to Utrecht Science Park by car and by public transport, time to reach a motorway, time to reach a railway station);
– development potential by local government (legal cooperation, welcoming attitude, willingness to invest, park management, strict admission policy).
To test the stability of the outcomes two sets of weighted variables were used, which had no great impact on the outcomes. Utrecht Science park now starts to use a nearby complex as its first satellite. The other selected sites are under further investigation.

With or without branches, larger regions can have several innovation areas within its borders. An interesting example in The Netherlands is the Eindhoven region (figure 7) which has a mix of co-innovation parks, science parks, university campus, so-called creative factories (a cluster of creative or innovative small firms in an old factory). To profit from such a constellation and in general of an overrepresentation of innovative companies just innovation area management will not be sufficient. Regional management is needed to link innovation companies, institutions and innovation areas. Such a strategic regional cooperation between all relevant parties is also a good starting point to link the region to global networks and become a hub in these networks (some information on networks on a higher geographical scale will be presented later on).

Figure 7: Eindhoven region (The Netherlands) as an example of an innovative region with several focal points
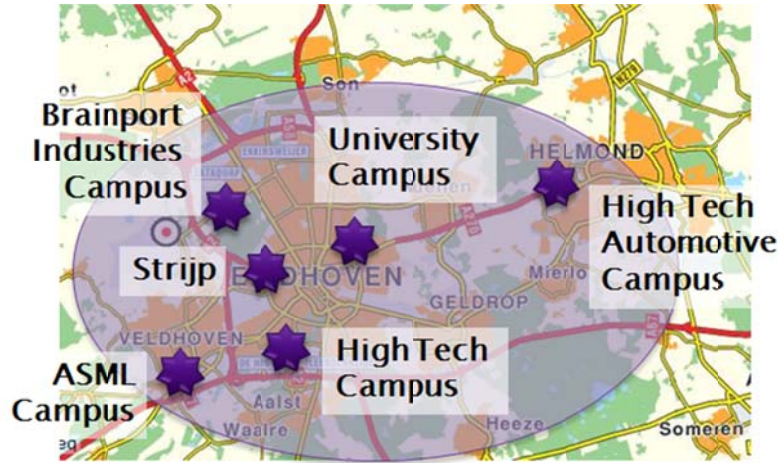
Regional cooperation

The combination of different types of innovation areas with regional cooperation between parties involved, has made the Eindhoven region a key player in innovation and in global innovation networks. The Eindhoven region promotes itself as Brainport. Main goal of Brainport management is not the development of innovation areas but is achieving economic growth. The focus is primarily on innovation networks and the business environment that is needed to develop and sustain these networks. There is no direct link between the management of the innovation areas and regional management.

The region is now working on a new strategy: Brainport Next Generation to be able to adapt to new developments. They will move towards a Multi Helix model which also involves citizens, customers, consumers, investors, designers, artists and corporations. It is expected that by broadening the scope faster implementation and an accelerating rate of innovation will be possible. Brainport wants to achieve breakthrough projects and 'living labs' will be set up by strong consortiums of innovative companies, knowledge institutions and social partners.

Another example of regional economic cooperation is Science Port Holland which was founded in 2008 and is a regional partnership of the municipalities of Delft and Rotterdam and the Technical University of Delft. Together they worked towards the realization of an attractive business environment within the region Delft - Rotterdam for knowledge-intensive companies. One of the tasks of Science Port Holland was the development of five innovation areas. Today the name of the organisation has changed into InnovationQuarter and there is no longer a focus on developing innovation areas. The focus today is much more on the regional-economic aspects of innovation. "The mission of InnovationQuarter is to strengthen the regional economy by supporting and stimulating the innovation potential of the area. In close cooperation with all major corporations, educational and research institutions - like the Erasmus University Rotterdam, the Delft University of Technology and Leiden University - and government organisations, InnovationQuarter supports technological developments, encourages entrepreneurship and invests in start-up companies."

Hubs in global networks

At the regional level linkages between companies and institutions are easy to establish. A good functioning of regional networks, together with other factors (such as labour market, infrastructure, living environment, etc.) can make a region and its innovation areas a success. Although these regional networks or ecosystems are crucial, most important are the higher level networks: national and international, which are in first instance determined by the linkages of individual companies and institutions. Information on innovative developments is such a valuable asset that in fact distances do not matter. Today worldwide communication has become so easy that innovation often happens on a global scale. "The innovation activities are becoming borderless, yet interconnected. Thus, the future success of innovation ecosystems is measured increasingly in the abilities of innovation actors (and core organisations) to connect and manage talent, partnerships, clusters and practical innovation processes – in combining the local knowledge base into the global innovation power grid" (Launonen and Vitanen, 2011). In a survey among entrepreneurs established on Dutch STPs 64% acknowledged the following statement: ""If it is about really crucial knowledge for my business, distant is no issue. If necessary, I will travel to the other end of the world to gain this knowledge".

Results from the same research project seem to suggest that size and constellation of innovation areas seem to play a role in the linkages and the intensity with which an innovation area or a region is taken up in global networks. Leiden Bioscience Park in the western part of The Netherlands is a rather stand-alone development in its region, whereas – as shown before – the Eindhoven region has a number of innovation areas and a strong regional cooperation of stakeholders involved. It is interesting to see that the companies in Leiden Bioscience Park are much more interested in global linkages than Eindhoven is, whereas the companies established on High Tech Campus Eindhoven show strong local and regional linkages, demonstrating the strong regional network (figure 8).

Figure 8: regional focus of companies on two Dutch science parks
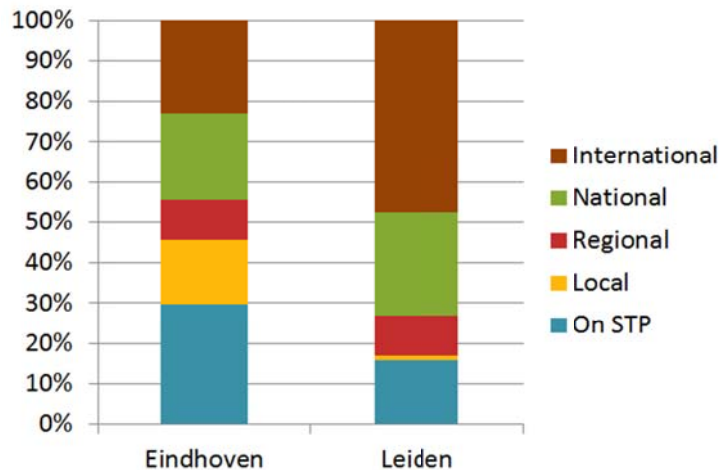
To conclude

It must have become clear that buildings are no longer the main aspect of science parks and – more broadly – innovation areas, but that community building and networking are essential. This distinguishes this concept from industrial parks, business parks and office parks. Which doesn't alter the fact that ultimately the businesses and institutions located in the innovation areas also need a roof above their heads. In view of this, specific requirements can be placed on buildings, particularly from the desires for community building and networking. For instance, pedestrian flows, the creation of meeting points, concentration of catering and restaurant facilities where pedestrian flows meet, creative work environments, etc. For the successful management of a science park, it is crucial that the different layers in the social-spatial structure of a science park are recognised and are connected: the infrastructure, the buildings and the networks. This actually makes an interdisciplinary set up of the management team an absolute necessity.

In light of the developments outlined here, it is obvious that new innovation areas should be developed in accordance with a modern plan. This means they are embedded in the regional economy and are part of broadly set up innovation programs. All of that in an attractive spatial setting with real estate which optimally facilitates this specific way of working. This can only be successful if these developments are managed from an integral management philosophy. It concerns not only the management, though also the nature and the design of the buildings, the quality of the surroundings and the possibilities for meetings etc. The older science parks and co-innovative parks are not sufficiently geared to do this. If they want to keep up with the increasingly faster paced developments in the area of innovations, a physical and functional redevelopment will be required, including a reorientation of the management.

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