

# BACK TO THE FUTURE OF HIGH TECHNOLOGY FANTASIES?

*Reframing the Role of Knowledge Parks and Science Cities in Innovation Based Economic Development*

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## **ABSTRACT**

This paper deals with the question of whether it is possible to construct deliberately a new science district in an old industrial region. The focus for the paper is to ask whether it is possible to find a way to strategically co-ordinate the various partners in the project to configure developments in ways that deliver real economic benefits for the firms on the science park. The paper explores how urban science projects become spaces where various stakeholders seek to fit their own particular interests in innovation and territorial development, and at the same time, the success that these strategic projects – in which the participating businesses' interests are one of many competing interests – have in helping to support knowledge spill-overs which support local business innovation. The paper draws on a case study from one region, Twente, in the East of the Netherlands to examine the reality of the fulfilment of the strategic ambitions for a new knowledge district. The paper finds that there is a mismatch between the political ambitions and the economic reality, but at the same time that firms and policy-makers appear to regard the project as a success. The paper then reflects on this apparent cognitive dissonance and what it might mean more generally for the apparent rise of strategic urban science as one of the new policy repertoires of strategic urban management.

Keywords: urban science policy, urban planning, strategic planning, science parks, regional innovation

## **INTRODUCTION**

This paper is concerned with the urban function of the myriad new constructions springing up which seek to ‘place’ scientific and innovation functions within urban contexts to both stimulate urban growth as well as strengthen the quality of that science. Our argument in this paper is, in line with Perry & May (2010), that we are witnessing the emergence of a new repertoire, the idea of an urban knowledge district, related to the rise of the new knowledge economy (*cf.* Temple, 1998 for an overview). The urban knowledge district fulfils a critical role connecting the city to wider knowledge production and innovation activities (Bathelt *et al.*, 2004; Benneworth *et al.*, 2009). But much thinking about these districts has shown a distinctly aspatial characteristics, focusing primarily on creation of a new node in global knowledge production networks rather than considering how that connectivity affects local urban function. As these concepts and repertoires have become influential in policy circles, there has been a tendency to stress the ‘global science’ dimension over the ‘local urban dimension’.

In this paper we seek to redress this imbalance by focusing on one particular urban policy field, how namely knowledge-based urban development policies, or science city projects, drive a particular urban processes, that of innovation. To do so we draw on three specific literatures which have dealt with urban science policy to date. The first is that there is a widespread recognition of the ubiquity of the knowledge economy, and the increasing reliance of general economic prosperity on place specific capacity to innovate (*cf.* Temple, 1998 for an overview; also Perry & May, 2008). The second is that there has been in the last two decades a resurgence of the importance of the region as a critical scale for innovation activity (Hardill *et al.*, 2006). The third is that there has been an attempt by policy-makers to recognise the first two of these tendencies with the increasing ubiquity of regional innovation policy as a focus for action (OECD, 2010).

We follow May & Perry (2010) and Benneworth *et al.* (2011) in arguing that there is an implicit urbanity in many of these models of urban innovation policy. The rising popularity amongst policy-makers of Richard Florida’s *Rise of the Creative Classes* (2002) has seen a policy-focus on cities as attractors and anchors for the necessary human resources for effective innovation. But the problem with the way these innovation policies have emerged is that they have taken a very simplistic, and one-dimensional view of the city. So in what Perry & May (2008) call ‘Knowledge-based urban development’ theories, there is a possibility to

look in quite a nuanced way in the ways in which investments in science, technology and innovation interact with the production of dynamic urban spaces. Yet, there has been a tendency for the assumption of a kind of naïve ‘urban science’ in which primacy is given to the drivers and logic of knowledge-based economic development (Benneworth *et al.*, 2011).

We characterise an urban innovation project as a city-based science development which seeks to stimulate innovation across a wider regional hinterland by supporting and stimulating connections with ‘global’ knowledge networks, thereby creating a central knowledge district. Our research question is whether it is possible for urban policy to achieve such a development – in short to purposively create an central knowledge district – when the scope of urban policy is necessarily limited to the urban locality. To do this we use a two-sided study of a single urban innovation project, that of *Kennispark* in the east of the Netherlands, and explore both its policy evolution and its success in stimulating high-technology entrepreneurship linked to a substantial regional knowledge producer, the University of Twente. This provides the basis for a more nuanced discussion of the spatiality of knowledge-based urban development.

## ***THE LOST CITY IN URBAN SCIENCE POLICY***

The background to this paper is an underlying interest in the challenges and problems raised by contemporary attempts to make sense of innovation and the knowledge economy, and to develop successful policies to address the political challenges that the knowledge economy brings. We point to a growing consensus that cities are key nodes in the knowledge economy, and managing cities as space for knowledge activity creates new opportunities for urban development trajectories. There has been an upscaling of policy ambitions concerning innovative spaces from the level of the building or block to knowledge-based districts. At the same time, the tendency by policymakers to think of the city in aspatial terms, part of the strategic management turn in urban policy, has led to the development of large scale science district plans which at best demonstrate a rather thin understanding of intra-urban dynamics. Two literatures are here salient in understanding these changes, that of regional innovation models, and strategic urban management.

### *Regional innovation models*

The first set of debates stem from studies of territorial growth, and an increasing emphasis through neo-endogenous theories of the importance of local knowledge generation and absorption capacity to driving productivity growth and increasing welfare. These debates are

characterised by a strong consensus, summed up neatly by Perry & May as the phenomenon of knowledge-based urban development (KBUD):-

→ a dominant consensus [which] has emerged around the need to increase the inter-relationships between universities and their localities for the mutual benefit of all involved ... cities and city-regions are adopting a number of strategies and policies designed to build science cities, knowledge capitals, silicon alleys or technology corridors” (Perry & May, 2010, p. 6)

The extent with which these notions of KBUD (what we refer to as ‘urban science’ in Benneworth *et al.* (2011)) are being developed, advocated and implemented makes the task of a critical reflection on its value vital. We argue that urban science in its many forms have to be understood as the latest incarnation of territorial innovation models (Moulaert & Sekia, 2003; Legendijk, 2006), which is itself part of a wider shift in territorial economics towards neo-endogenous approaches to economic development (Bradshaw & Blakely, 1999). In the question of what makes territories attractive to investment and supportive of endogenous growth, the answer has shifted from factors of production towards dynamic, learning-driven supply chains, clusters of production, to innovation and innovative ecologies (*cf.* Morgan, 1997, Legendijk, 1999, Rutten, 2002; Bathelt *et al.*, 2004; Wolfe *et al.* 2009; OECD 2011).

Unlike other forms of capital, knowledge capital is embodied in people, and created and transmitted via interactive, social processes (Nonaka & Takeuchi, 1996; Wenger, 1998). These social processes are not purely functional, relating to the purposive transmission of knowledge for economic ends, but become interwoven in people’s lives. A key process for knowledge based economic development is the operation of spillover processes. Rather than all necessary knowledge always being created *de novo*, new knowledge can be created by accessing, appropriating and building on existing knowledge capital. The ‘region’ is a natural space within which spill-over functions efficiently (Lorenz, 1999; Lawson, 1999, Longhi, 1999). Regions become home to ‘pools’ of highly skilled labour that help to stimulate innovation in other companies (Storper, 1995), even when it is not in those corporations’ economic interest to do so, and indeed corporations may work strategically to limit the benefits that regions may enjoy from their presence . Nevertheless, regions and the regional cultures that promote innovation are not instrumental and easily controlled or manipulable (Oosterlynck, 2007).

### *Strategic urban management practice*

In parallel with this widespread acceptance of the importance of local innovation spillovers to economic development potential has been the rise of the paradigm of strategic urban management. Strategic urban management is part of a wider trend in the provision of public services towards what Rhodes (1997) called governance in networks, and away from government in hierarchies. The key lines of force of this new paradigm, the so-called ‘new public management’, place the accent on harnessing the dynamic power of markets to solve complex societal problems (Eisenhardt, 1989; Ackoff, 1999). The aim is to stimulate efficiency in the provision of public services, with public agencies (government) setting goals and achieving strategic integration where there are possible areas of market failure (Kickert *et al.*, 1997; Koppenjan and Klijn 2004).

Kresl (2005) has highlighted how this has seen a response towards a range of cities responding to these by shifting from an interest in urban management in the round, towards a more specific focus on achieving urban competitiveness. This has been marked by a shift towards developing economic development strategies in which city councils are no longer the exclusive deliverer of services, although often funding and subsidising desired actions by others towards collectively agreed goals. One characteristic of strategic urban management is the tendency to specifically downplay the difficulties in managing partnerships to effectively co-operate in regional economic development.

But there is always a tension between the role of the city authority as an urban manager, and its role as a strategic innovation animator. There is a question over for whom is the city, and in particular how far should a city authority seek to attract potential ‘highly talented’ future residents at the cost of resources which are not then spent on existing residents (Moulaert *et al.*, 2000; Oosterlynck *et al.*, 2011). Science city approaches only ever cover a limited range of the interests of local authorities, and partnerships may agree activities or priorities which do not necessarily make sense from a wider public policy perspective (Benneworth *et al.*, 2011). Universities in particular can have strong private interests in science city developments which affect the resources they hold (particularly the value of their land) without necessarily paying directly back for the services and infrastructures which provide that value (Goddard, 2009).

The issue is not that KBUD is intrinsically bad, rather that particular decisions around spending on infrastructure and developing these new science city activities are often rather more politically complex than a simple urban strategy approach might suggest. The issue is

one of strategic fit, and in particular whether the particular proposal *‘fits’* with both the science base and the urban development trajectory of the city under consideration. By ignoring that question of fit, which relates to particular concrete realities rather than to a simplistic conceptual answer, *‘urban science’* as a policy approach creates a set of potential problems, or wicked issues, that are all too often overlooked and which undermine exploring the wider geographies of urban science.

### *The emergent ‘fit’ of science-based policies to economic development trajectories*

One interesting concept emerging between these two literatures is that of whether urban science projects strategically fit to particular urban fabrics in ways that create spill-over effects, when those two dimensions have completely separate logics, of urban politics on the one hand, and regional economic development on the other. In KBUD we see echoes of Lagendijk & Oinas’ (2005) *‘naïve, happy families’* approach where it is assumed that strategic urban management will be able to create local innovation spillovers. But we are concerned, as the twentieth anniversary approaches of the seminal Quintas *et al.* (1992) paper *‘High technology fantasies’*, of a recurrence of this problem. Quintas *et al.* found perversely rather than science parks adding to urban competitiveness, science parks were only successful in places that already had dynamic, knowledge-based economies (such as Cambridge in the UK). Science parks’ high-technology appearance played to urban managers political interests (alluring projects) whilst failing to always deliver regional economic benefits related to innovation spill-overs. This led to misplaced investments in *‘science parks’* that became little more than factory units near to universities or research laboratories.

It seems reasonable to ask whether strategic KBUD policies risk repeating the mistakes of science park policy in the 1980s? The answer to that question is of course emergent, and it is possible to point to a number of regions which were able use science parks as a sensible part of a regional development strategy focused on creating new economic development trajectories. Arenberg Science Park in Leuven, whilst modelled (explicitly) on Research Triangle Park in Durham, North Carolina, did form an anchor point for a technology development policy including IMEC which drove a *‘technological revolution’* in Flanders (Larosse, 2004). Likewise, in Tampere, Finland, traditional rivalry with Oulu might have motivated the Tampere science park, but its clever exploitation by the city government helped build four recognised national centres of scientific excellence (Sotarauta, 2006). In Scania, political willpower was central in creating the IDEON science park, originally anchored around Ericsson’s mobile telephony division, but which later evolved into a high-technology

innovative ecosystem with strengths in functional foods and biotech as well as ICT and engineering (Benneworth *et al.*, 2009).

All three examples all demonstrate is areas where the political construction of a science park fitted with a wider set of industrial transformations in this case characterised by increasing innovativeness. The policy focus was not specifically creating of a science park, rather creating the science park was one thread in an attempt to build new kinds of high-technology industries embedded into the regional fabric, making these science parks more than mere ‘Silicon Somewheres’ (*cf.* Hospers, 2006). Our argument is that urban science policy has yet to sensibly conceptualise the fit of the strategic development to the urban economic trajectory. Just as the successful examples of successful science park policies cited above ‘fitted’ on some level with the switching regional industry trajectory (Benneworth *et al.*, 2007), we argue that we would expect to find, with successful KBUD strategies, some kind of fit with the wider urban regional development trajectory.

There are various ways of conceptualising this ‘strategic fit’; Benneworth *et al.* (2009) consider this in terms of the bilateral strategic relationships between universities and cities, whilst Benneworth *et al.* (2011) focus on how science parks become sites of strategic long-term agreement between partners. Both of these approaches focus primarily on the political dimension, or conceptualise the necessary economic/ innovation dimension in terms of how particular projects are supported by economic actors such as local firms and real estate developers. What has not been satisfactorily considered is the strategic fit between the economic and political/ policy dimensions, and it is to that gap that this paper now turns for its operational research questions. Urban science policy (*cf.* OECD, 2011) offers a number of tools that may be attractive from both a policy and economic perspective, but can particular projects deliver both in parallel, strategic urban management and local economic development.

## **THE STRATEGIC FIT OF URBAN SCIENCE POLICY TO CITIES**

In analysing urban science projects, we make a distinction between two elements, the policy and economic dimensions. In policy terms, we place urban science policy as part of the latest iteration of territorial innovation policies emerging since the 1970s. Although partly inspired by academic thinking, these policies have always suffered from a blunting of the nuances of academic prescriptions by local necessities, as well as being trapped by a need to focus on local political boundaries rather than the natural spaces of innovation (Lovering, 1999; Cooke,

2005). One reason that these territorial innovation policies have been so successful is that they have been mobile, (*cf.* Cornford & Lagendijk, 2000; Hassink & Lagendijk, 2001), supported by international organisations such as the OECD and European Commission. Part of this mobility of ideas has come through the distillation of best practice guides which simplify – and blunt – academic ideas into what Martin & Sunley dismissed as ‘policy panaceas’ (2003).

Science cities fall into this category of highly successful and portable ideas and indeed the policy notion has been distilled into a number of prescriptions and policy frameworks for successful implementation. The OECD (2011) have identified the ingredients that contribute to the recipe for a successful ‘science city’, and highlight the degree of different national contexts within which science cities are currently being developed and implemented with often substantial resource commitments (see below).

[TABLE 1 GOES ABOUT HERE]

But placing urban science in this lineage of neo-endogenous development provides a stark reminder of the limits of the policy applications of these models. We have already experienced two waves of ‘policy bubble’ in these third wave neo-endogenous models. The 1980s enthusiasm for science parks was tempered by findings that science parks tended to be beneficiaries rather than creators of territorial economic advantage (Massey *et al.*, 1992). Likewise, 1990s enthusiasm for clusters sparked by Porter’s (1990) bestseller was tempered by a realisation that whatever clusters were, they were not a policy panacea (Martin & Sunley, 2003). Indeed, there was a wider concern that the enthusiasm of policy-makers for those ideas had come at the expense of their intellectual rigour (Lovering, 1999, but see Landabaso, 1999 for a rebuttal of that point).

Of course the lessons of these episodes is not that these original ideas or analyses were in some way flawed, rather the risk in simplistically assuming that universities, cities and their regions will always work straightforwardly together towards common regional aims through strategies (Christopherson & Clark, 2010). There is likewise a risk in assuming that a strategy will achieve its stated aims, or indeed that its stated aims are the implicit collective aims of the partnership. This is a misunderstanding of the ultimate purpose of strategic planning, which is to provide a framework to respond to uncertainty and work towards certain goals in a complex environment.



Yet, the accent in urban science policy lies increasingly in delivering large development projects rather than providing a policy mindset working towards delivering particular outcomes. This is partly a consequence of the diversity of urban science policy, and the fact that a single project may span several policy domains with their own stakeholder networks, drawing political and policy interest to managing these networks to secure the policy rather than ensuring the delivery of downstream innovation benefits. Benneworth *et al.* (2011) have already highlighted the complexity of interests in urban science projects, and the creation of innovation benefits for local businesses remains relatively underrepresented (see Table 1 below).

[TABLE 2 GOES ABOUT HERE]

We have already argued that strategic fit is not purely about the mutual fit between partners' interests but additionally to the way the political and economic dimensions fit together. It is this dimension which we regard as particularly under-researched. In parallel with these political interests, the projects can also be understood in terms of their delivery of 'knowledge district benefits'. To understand the issue of real economic benefits, we draw on the extant literature on science parks, which has defined the benefits that they bring in four domains, high technology business, job creation, access to support services, and innovation activities. We refer to these as science park benefits, which set out the extent the space has started to function as an operational knowledge district.

**High-technology businesses.** Policy makers and universities alike often promote the establishment of urban science project to concentrate universities and other knowledge production centres, and companies in one single geographical location. The idea behind these project is that the geographical proximity will spur technology transfer activities and, as a result, promote the creation of companies based on new knowledge produced locally (e.g. Castells & Hall, 1994). These high-technology businesses are believed to bring innovations to markets and help regenerating the regional economic fabric.

**Job concentration.** Urban science projects seek to create jobs to increase regional economic prosperity and anchor highly-educated workers in their region. Science parks are likewise motivated by attracting established companies and supporting support the creation of new ventures, to which we refer to generically as job concentration.

**Service Provision.** Previous research on SPs identifies service provision to tenants as one of their activities. This means that SPs concentrate economic activity within a delineated

geographical area but are also active in providing support services to their tenants (Link & Scott, 2003, 2007). Arguably, these services are less structured than in business incubators (e.g. Bergek & Norrman, 2008; Hackett & Dilts, 2004) but very similar in nature (Ratinho & Henriques, 2010; Sofouli & Vonortas, 2007). We categorized service provision in three main areas: infrastructure, business support and access to networks (see, for instance, Bruneel *et al.*, 2012). The defining feature of any urban science project is infrastructure. As property-based projects (Phan *et al.*, 2005), these developments sell property for companies to build their own premises or lease offices in business centres or business incubators. Further, the concentration of universities and companies assumes access to specialized infrastructure such as universities laboratories. Finally, besides office space, we also considered complementary resources such as parking, sport and eating facilities. Business support consists of any kind of mechanisms to help companies to flourish and grow. For example, nascent ventures within incubators or SPs are often assigned a coach (Bergek & Norrman, 2008; Peters, Rice, & Sundararajan, 2004) while more mature companies might enjoy the services of a business development team (Gorman & McCarthy, 2006; Robson & Bennett, 2000). More specific entrepreneurial competences are increasingly popular within business support activities as well as financial, deemed as one of the main difficulties small companies face (Clarysse & Bruneel, 2007; Wright *et al.* 2007).

**Innovation activities.** Urban science projects aim at promoting innovation activities by concentrating companies and universities in one location, as a means of facilitating interactions between those companies in the innovation process. There is a recognition of the interactive nature of knowledge creation with a shift in models from technology transfer through knowledge transfer to knowledge exchange and co-creation, and this need for interactivity places a premium on proximity. Proximity is not exclusively geographical but includes dimensions such as organisational, cognitive and disciplinary (*cf.* Boschma, 2005), co-location may help to support community-building and the development of common codes and cultures which support collective innovation activities.

Therefore in this paper we seek to address the overarching question of

In progressing a project that is highly complex and in which many partners have diverse interests – short-term and long-term, opportunistic and principled – is it possible for urban science policy to create real economic spillover benefits?

We have already noted that these two elements are clearly intertwined, and our focus here is on looking at the way that the creation of ‘science park benefits’ becomes a political goal *ex*

*ante*, and a reference point *ex post* for policy discussions. In this paper we ask three research questions to understand the issue of strategic fit of the political and economic dimensions of urban science:-

- How do creating local spillover effects emerge as a strategic priority in urban science projects?
- Do urban science projects in practice create innovation spillover effects stimulating local economic development and creating a ‘central knowledge district’?
- What is the relationship between this strategic fit and the output of an urban science project?
- How can we begin to conceptualise strategic fit within urban science projects in a dynamic way between their political and economic dimensions?

## **METHODOLOGY**

### *The Kennispark case study*

We utilize the case study method analysing the foundation, development and current situation of one representative urban science project: the *Kennispark*, located at Enschede, the Netherlands. This piece of research fits with an ongoing programme of work into *Kennispark* and the regional economic impact of the University of Twente. We approach the problem from a critical realist perspective: we construct a narrative of reality which we use to test our research problems; we acknowledge that there are limitations to the reality which can be revealed through case study work, but a triangulation of evidence allows something meaningful to be said about the nature of ‘reality’. This is not strictly speaking a case study in the sense of Yin (2008) which is typically selected on the grounds of its structure to fit the needs of testing a theoretical question. The structure of our approach is that the case study appears to be an interesting example of a theoretical phenomenon, and by examining that phenomenon we gain insight into the architecture of the theory.

The theoretical process with which we are concerned in the paper is the attempt to deliver urban strategic management through ‘urban science’, namely creating new knowledge districts in an attempt to create or improve a novel urban function that improves the overall competitiveness of that city. Our operationalisation of this issue into a research question is to look at the extent to which the *Kennispark* district functions as an integrated knowledge district providing the four kinds of ‘science park benefits’ outlined above. To gain an insight

into this, we have sought to understand the composition of the firms located on the *Kennispark*, and the extent to which they have a regional locus to their innovation.

#### *Operationalisation and Data collection*

The focus for the research has been on gathering data in the four areas of expected benefits, firstly in the way that these benefits have been articulated in policy documents, and secondly whether these benefits have been realised in terms of science park outputs. The benefits were operationalized in the four areas set out above around which data was gathered.

**High–technology businesses.** In order to understand whether the *Kennispark* indeed concentrates high-technology companies within its borders, we analyse the sectors of economic activity of its entire population of companies. Several official categorizations such as high-technology and knowledge based services aggregations (Eurostat, 2009) will be used. We also look at the legal status of each organization located with the *Kennispark*, and triangulate these findings with the Deloitte’s Fastest Fifty, a ranking of the fifty top technology businesses in the Benelux Countries. Entry requires that the company meets certain minimum size thresholds, is a technology development business, and located in Benelux, and is voluntary (i.e. firms themselves enter).

**Job concentration.** To estimate the effect of concentrating employment, we calculate the total job figures for the companies located in the *Kennispark*. Also, we analyse the relative job numbers per sector of activity using the categorizations described above. We refine this measure by excluding the number of employees of the University of Twente (ENUT) since the UT was already located within the area of the *Kennispark* and its variations in size can hardly be a consequence of planning policies around this geographical area.

**Service Provision.** To understand the level of services provided by *Kennispark* to tenant companies, we asked questions relating to both the regularity with which these services were needed by the innovating firms, and their frequency of usage . The list of services used in the survey was derived from literature and cross-checked with the management of *Kennispark* to make sure that those services are in fact available within the park. The choice of *Kennisvraag* (Dutch for knowledge demand) is a specific service offered on the *Kennispark* by which innovating firms with a knowledge demand can contact a specialist advisor who will help direct them to possible providers of answers to that question drawn from the university, polytechnic, consultant, business or student sectors.

**Innovation activities.** The innovation questions were derived from the Community Innovation Survey and sought to identify the extent to which there were patterns of ‘creative location behaviour’ suggestive of the emergence of a new knowledge district. We asked tenant companies whether they launched innovation into the market in the last calendar year (2010). To those answering yes, we assessed the degree of importance of internal, market, institutional and others sources using a four-point Likert scale.

### *Data*

We gathered data from three sources. We used the official Chamber of Commerce (CoC) database. Providing data to this register is legally demanded for all companies located in the Netherlands, and provides a time-lagged and restricted data set of basic information on companies. The information is based on the basis of legal entities which do not necessarily correspond to real activities. This database includes numbers of employees, turnover and sector of economic activity. The register reported a total of 433 firms located on the postcodes corresponding to the *Kennispark* area.

The second element of data was a short questionnaire to all firms on *Kennispark* for which an email address could be found. Of the 433 companies, it was possible to find email contacts for 234. We sent an web-based survey to all and received responses from 67. Of those, 52 were valid questionnaires and are used in the subsequent analysis, giving an overall response rate is approximately 22%. The survey included seven main question areas which sought to explore the nature of the business, its key resource dependencies and reasons for location at the *Kennispark*. Further, we asked about need and demand of services, and sources of innovation.

Finally, the research is framed by an understanding of the policies which have been employed in *Kennispark*, both currently and also historically in the genesis of the idea. We therefore draw on other work within our ongoing research into *Kennispark*, which has been published elsewhere as *inter alia* Benneworth & Hospers (2007a, 2007) and Benneworth *et al.* (2011) but also within OECD (2007) and Garlick *et al.* (2006). This work in turn draws on around eighty interviews with businesses, university representatives at a variety of levels and regional/local policy makers, as well as detailed documentary analysis of a range of policy reports over the last twelve years. One fundamental document here is the Stuurgroep *Kennispark* report (2008) which lays the foundations and strategies for the spatial development project of *Kennispark*.

## **KENNISPARK AS A POLICY SPACE AND PHYSICAL SPACE**

### *Introduction to the Kennispark case study*

Although the phrase *Kennispark* first occurs in a policy document in the municipality in 1999, to understand why this occurred requires a slightly more historical perspective on economic change in the east of the Netherlands. The region of Twente, shown in the map below, was chosen by King Willem II as the home for a new textiles industry after the loss of the southern Dutch (textile-led) provinces to the newly-formed kingdom of Belgium in 1839. The industry was driven by three things, foreign technology (primarily from Manchester and the north west of England), Baptist and Jewish entrepreneurs and Royal patronage. The textiles industry was a means of exploiting Dutch east Indian colonies as a source of cotton and a captive market. In the second half of the 19<sup>th</sup> century, the industry flourished, and politicians and textile barons used part of their protection to provide wages and social services for their workers. When the three elements of the system fell apart after WWII (colonies, protectionism, wage competitiveness), the Twente textiles industry quickly suffered at the hands of competition from low wage countries.

A university was immediately seen as a solution to these problems, and a grouping of regional industrial magnates came together to form the *Stichting tot bevordering van hoger technisch onderwijs in de noorderlijke en oosterlijke provincies*, which despite its rather abstract name had the specific goal of lobbying for a new university for Twente to revitalise its industrial base. The Dutch government created a second technical university in Eindhoven in 1950 in recognition of Philips' need for highly educated workers, and in 1959, a national competition for a third technical university was launched which culminated in the launch of the university in 1961. The university was located at the edge of the city of Enschede, close to the second regional city of Hengelo, on a country estate expropriated as enemy property after WWII. The university's purpose was explicitly to revitalise the textiles industry complex which also included advanced engineering and machine building companies supporting the industries. However, the university was not able to reverse the steady decline of the sector, and by the mid-1970s, the sector was so shrunken that questions were raised in parliament concerning the utility of maintaining a technical university in a region without a technical industrial base.

[FIGURE 1 GOES ABOUT HERE]

The response of the university was to reorient itself towards working directly towards the technical revival of Twente's industry. In 1978, the university created a "Transferpunt" as a

single contact point for firms to access the university's knowledge base. In 1982, prompted by a local newspaper article mentioning firms formed by university spin-offs, the university board commissioned research onto how the university could support spin-offs. The report became the basis for the TOP programme (Temporary Entrepreneurs Scheme), launched in 1984 which provided starting entrepreneurs with business advice, research contacts, a physical location within the University and a subsidised loan (Van der Sijde *et al.*, 2002a; 2002b). The university also became involved in negotiations between the regional development agency, the municipality and the Computer Data Corporation to create a Business Technology Centre adjacent to the campus as an incubator *avant la lettre* for these spin-off firms. In 1989, the success of the BTC led the municipality to create together with the university a Business and Science Park on the area to the south of the campus, where the BTC was located.

The BTC was successful in its aim of incubating high-technology businesses, and the BSP began to attract new R&D investors seeking connections to the university (including for a time Ericsson R&D and Lucent Technologies), as well as providing a site for the growth of spin-up and start-up firms formed by university start-ups and graduates. The BSP was created on the basis of a formal covenant between the university and the municipality of Enschede, which expired after a decade. This technical issue drove the partners in the BSP to consider how the BSP could be further developed and so we see the record from 1999 showing that the BSP partners met and for the first time the idea of a *Kennispark* was mentioned, although without specifying precisely what this term meant. Part of this success was because of the success of the university in creating companies through the TOP programme over a 15 year period.

#### *The evolution of the Kennispark idea and reality*

The idea was given further development in the following decade in response to three crises, each of which required partners to specify more clearly what was to be meant by the *Kennispark* idea. The first crisis came in the early 2000s, in the wake of the high-technology crash, where university, municipality and businesses were severely hit by economic problems; the university's estate reached the end of its life requiring a mammoth rebuilding programme, the municipality faced the announced closure of a Dutch Air Force base employing around 1,500 people locally, and the dot.com burst saw a large number of high-technology businesses fail, including the emblematic Ericsson R&D facility. In response to this, regional partners assembled a strategic plan for regional growth, in which the *Kennispark* was to be one of the

flagships for regional (and ideally national) investment. In this, *Kennispark* became more precisely specified as a reorientation of the university and BSP as a single 20 ha high-technology space that would become home to firms employing 10,000 people (see diagram below).

[FIGURE 2 GOES ABOUT HERE]

The second crisis which emerged was a regional political crisis driven by a split in the region between rural and urban municipalities. The reality was that *Kennispark* was in the context of a Dutch government seeking to promote high-technology economic development (Minez 2004) the best opportunity for attracting national subsidies. At the same time, rural municipalities could not see why they should have to invest their reserves in projects which were primarily of benefit for the urban regions. There was a lengthy negotiation between the municipalities in the regional body in which the concession was made that *Kennispark* had to serve a genuinely regional function, and to represent more than a successful district in the city. It is at this time in 2008 that *Kennispark* evolved to being a regional asset, with more emphasis placed on its wider regional benefits than purely for the host city of Enschede.

The third crisis came in the period 2008-10 when the new district had to be fitted into the spatial plans of the city of Enschede. Prior to that point, the spatial structure of the *Kennispark* had been purely imagined, so architects plans were drawn up on the basis of what made sense for *Kennispark*. In this period, the ideas for *Kennispark* had to be fitted into the practical demands which the city placed on all developments within its boundaries in terms of suitability of development and servicing. The university for the first time was brought into the control of the city's parking department and parking restrictions/ penalties were enforced from 2010. The nature of the crisis was in seeking to remove the elevated motorway ('Viaduct') that physically separated the two halves of *Kennispark*, there was resistance in both City councils of Enschede and Hengelo over the impact that this would have on the overall traffic circulation and commuting times for *their respective residents*.

The stable notion of *Kennispark* settled around three key points, firstly, creating a meeting place for innovative, entrepreneurial and creative people. The secondly was strengthening Twente's regional innovation capacity, and the third was strengthening the synergy between knowledge and practice (Stuurgroep *Kennispark* 2008).

These would be delivered through four processes, which were described as combining, completing, coordinating and communicating. Combining was to be done by bringing all the



existing innovation support activities around the university and BSP into the single ‘umbrella’ organisation. The completion was around the development of a common strategic plan for these activities, which co-ordinated the activities within the innovation ecosystem around *Kennispark*. The final element was the communication of the enhanced strength of the whole system.

## **THE OBSERVABLE SCIENCE PARK BENEFITS OF KENNISPARK**

In the second part of the empirical analysis, we explore in parallel the real benefits of *Kennispark* observable at this stage. The survey was undertaken in late 2011: in our research, the first mention that was made of *Kennispark* as a funding source was in an interview in August 2004, in the context of the creation of a business acceleration for biomedical engineering spin-offs (although the precise plan has evolved since then). Therefore we can be confident that these results represent several years of activity, and provide a first insight into whether the plans are indeed helping to develop real economic benefits in terms of strengthening the regional innovation system.

### *Job concentration*

The Chamber of Commerce data highlights how the *Kennispark* location contains four main high-technology activities, the University of Twente (UT), the BTC (which has evolved into a technology business centre), an incubator unit (the so-called VentureLab Twente) and the business locations on the former BSP. As was intended with the merger of the two locations, there are currently businesses physically located in the UT as part of the business accelerators, which are locations intended to support research valorisation and exploitation. Within these four locations, there are a total of 433 organizations legally established in postcodes which correspond to *Kennispark*. Of those, 165 are established in the UT campus while the BSP houses 268. The BTC alone is home to 46 companies and the VTL 11.

However, these figures are slightly misleading because of the nature of what constitutes a legally established organization. One of the side-effects of Twente’s quarter-century of innovation activity has been a proliferation of ‘foundations’ (like the original ‘Stichting ter bevordering’ and its successor the *Universiteitfonds*) to encourage co-operation, to meet the needs of European funding projects and to insulate marginal activities from doing damage to universities and businesses. Of the 433 organizations, 105 are foundations; there are 91 sole-traders (‘ZZP-ers’), 200 limited companies, 23 partnerships, 3 co-operatives and 2 joint stock

companies, which act as holding companies for groups of trading activities, more common among the more well-established, larger businesses.

There 433 organisations account for a total of 6056 full-time employees working at the *Kennispark* postcode locations. That rather high number includes the 2657 employed at the time of writing at the University of Twente. Other significant employers include an accountants office and financial consultancy company (340), the chamber of commerce (190), lawyer company (143) and a civil law notary (120). There then follow the first of two technology-based companies: Universal electronics (103) and XSens (94). The full employment distribution is shown below (Figure 3).

[FIGURE 3 GOES ABOUT HERE]

[TABLE 3 GOES ABOUT HERE]

What is most significant is that the most frequent category are companies with zero employees representing 32.6 % of all companies. There are 141 of these shell companies (Table 3). Of companies that actually employ people, there are one quarter (26.1%) of all firms that have only one employee, and companies with less than 5 employees account for 15.5% of the *Kennispark* firms. In total, 84.8% of *Kennispark*'s companies have less than 10 employees.

#### *High technology business*

The figures relating to high-technology sectors are clear, and indicate that the majority of employment is not in high-technology manufacturing but rather business services. Sectors of activity using two digit NACE coding show that financial service activities are the most active sector within the companies located in the *Kennispark* (17.8%, 77 companies). Computer programming, consultancy and related activities come next (12.0%, 52 companies) as well as Scientific research and development (6.9%, 30 companies). We analysed the technology intensity of industries using the Eurostat three-digit classification (Eurostat, 2009) (Table 4).

[TABLE 4 GOES ABOUT HERE]

We also see that the 23 manufacturing companies account for only 158 jobs, representing a below 5% of total employment, when excluding the UT. Similarly, we see that knowledge based services companies employ 3223 people which translates in 94% of total employment (excluding the UT).

### *Service provision*

The third area we considered here was the service provision offered by *Kennispark*. This data came from the web-based survey to firms, and asked firms both their reported need for those services, and the frequency with which the firms were using these services within *Kennispark* (Figure 4).

[FIGURE 4 GOES ABOUT HERE]

We then turned to look at given that demand for services, where were the areas where there was unexpectedly high or low use of those services. Results show that recruitment of talent from the UT is the most needed service among companies located within the *Kennispark*. Office space, parking and eating facilities come next. Notably, needs for financial support, coaching, training and the commonly accepted services for start-up companies are ranked much lower (Figure 5).

[FIGURE 5 GOES ABOUT HERE]

The table below (Table 5) shows the areas of greatest demand for and the use of those services provided on the *Kennispark*. What the table indicates fairly unambiguously is that the two specific services are the use of talents and access to the laboratories, both of which reflect the particular research programmes and infrastructures that are present on the campus. The other three variables are ‘\_placeless’ in that they could be provided anywhere but the talent recruited by firms and the use of the laboratories are highly specific to the research groups at Twente.

[TABLE 5 GOES ABOUT HERE]

To gain a better understanding of the extent to which tenants’ needs are met by *Kennispark* services offered on this matter, we calculated the rank correlation between need and use for service. The Spearman’s rank correlation coefficient is a non-parametric measure of dependence between two variables and allows, in this case, to assess the extent to which the usage of a given service is related to the need felt. High correlation coefficients mean that companies with relatively high need for a given service are also using it more frequently. Conversely, companies with low need for a given service are the ones not using it very frequently. Low values of the Spearman’s correlation coefficients mean that companies are not using a service despite a high need for it (positive values) or use very frequently a service which they do not need (negative values). Table 6 shows the values for Spearman’s correlation coefficients for each service.

[TABLE 6 GOES ABOUT HERE]

The fact that the average values of use are lower than the reported need for every service provided by Kennispark can suggest that tenants' demands are not being met. However, the Spearman's correlation values show that in the cases of office space, laboratory access and talent from the UT, tenants are satisfied, that is, their needs are correlated with their levels of usage. Innovation activities

The first contention was that greater interaction with the University of Twente would indicate *Kennispark* functioning as a more regional and creative knowledge district. What is interesting is that despite the absence of firms in the high-technology sectors, including the total absence of firms in the pharmaceuticals industry, 72% of the surveyed companies reported innovations within the last year. This represented 38 of the 52 respondents to the questionnaire. The first subsequent question to this population of innovating companies was to ask them to highlight significant sources of knowledge in the innovation process. What we see that is interesting is that after the usual sources of knowledge for innovation (internal and within the supply chain), the university were the fourth most source of high-intensity and medium-intensity knowledge use (Table 7). Thus, despite the apparent profile of *Kennispark* as a business park for knowledge-intensive business services, there appears to be evidence that the park is functioning at least in helping those firms access knowledge (Figure 6).

[FIGURE 6 GOES ABOUT HERE]

[TABLE 7 GOES ABOUT HERE]

## **THE POLITICAL AND ECONOMIC REALITIES OF KENNISPARK**

### *The Science Park Benefits within the evolving Kennispark plans*

The original attraction of the *Kennispark* idea lay in its early success in stimulating high-technology entrepreneurship through the TOP programme. This notion of success carried through into the *Kennispark* plans, although a question can be raised about how that success was defined. Clearly to political actors, its success lay at least partly in the fact that the policy was perceived as successful to external funders, national and European, and could open doors for additional funding streams. The idea was almost that the BSP was superlunary, made of a special ground that promoted entrepreneurship, rather than being based on a detailed understanding of the nuances and limitations of the TOP programme and university-business interaction in the BSP. This can be seen in the bluntness that the plans articulated the creation

of science park benefits, which we now articulate according to the previously developed framework.

**High technology business.** The *Kennispark* plans included a series of elisions within the definitions of what constituted a high-technology businesses, which was never properly defined. A key word here is in the notion of fast-growing technology-related businesses, rather than relating to particular sectors or business processes. The master plan identified five key business groups, new start-ups, growing start-ups, R&D, high value production and technology services, alongside research institutes and training space and allocated floorspace notionally between them. Nevertheless there was no clear definition of technology – a link to the university or an existing high-technology business seemed to be adequate. The regional innovation platform did identify five cluster areas in which the region was strong, but a key determinant of this was that these five sectors should fit with national innovation plans, based around ten leading sectors, rather for example criteria for access to housing, services or business support.

**Job concentration.** The job concentration plans were driven by the overarching necessity for *Kennispark* to have a regional function of employment generation. This led to the headline target for job-creation being stipulated of 10,000 workplaces by 2020. Normally job concentrate should seek to avoid intra-regional displacement, that is businesses moving within the region, but the target was articulated solely that the park would house 10,000 jobs. This could potentially work to undercut the wider regional function of the park. The baseline for this was an existing employment of 7380 people, with 3342 working on 82 businesses on the campus side, and 4038 working in 228 businesses on the BSP side (Stuurgroep *Kennispark* 2008).

**Service Provision.** The service provision offer was strongly shaped by a detailed understanding of what had already been created in the region through a number of experiments of varying success. However, the innovation and entrepreneurship support infrastructure had not just evolved to reflect regional demand, but also the availability of national subsidies. The strategy made the assumption that the regional service provision had its own internal logic, whilst a dual logic, of available funding and success, is clearly discernible, with activities like VentureLab Twente reflecting both past successful projects and willing funders to continue those activities.

**Innovation.** The initial strategy had arguably the least to say regarding the building of proximity through co-location. The idea of building proximity through co-location is evident

in the desire that *Kennispark* would become a ‘meeting point for innovative, entrepreneurial and creative people’. The concept was that there were barriers between the two halves of the campus, and spatially reducing barriers and increasing flows would increase interactions, and create proximity which would be beneficial for supporting the overall innovation system. Part of *Kennispark* was as a home to existing collaborative innovation projects subsidised by the Province and national governments, but beyond this, it is hard to discern much of a concept for building proximity in the *Kennispark* concept.

#### *The Real Science Park Benefits emerging within Kennispark*

**Job concentration.** There is limited evidence suggesting the delivery of employment concentration to date around *Kennispark*. Firstly, total *Kennispark* employment appears to have fallen from the 2006 baseline in the Sturgroep report, but these two data sets are not consistent so that is a difficult conclusion to draw. The most significant finding is that there is an overrepresentation of starters or at least micro businesses, and a relative underrepresentation of growing local businesses, or at least firms with 20-100 employees. This is a tricky figure to interpret because qualitative research elsewhere has shown that there are indeed companies which move from being start-ups to growers and which create significant numbers of jobs. Firms in *Kennispark* has featured in recent years in Deloitte’s Benelux Fastest 50, which offers a proxy measure from progression from start-up to growing business. There is therefore some progression but not a clear sense that concentration is creating cohorts of firms which develop in situ and support an evolving innovation ecosystem.

**High Technology Business.** The figures about high technology business reflect in part the origins of *Kennispark* in the TOP programme, which created spin-offs from graduates which developed a business plan over one year. The TOP programme was clearly oriented towards consultancy rather than product development activities, and even product development activities often subsidised their R&D work with consultancy. Part of the financial services activity is largely unrelated to the science park idea, with a number of legal and accountancy firms which simply use *Kennispark* as a pleasant location. But there is a real classification problem here in that there are ICT businesses which develop a “product” which nevertheless are classified alongside business which provide routine ICT services such as website hosting and development. Benneworth & Hospers (2007) have already sketched the development of the ICT cluster around Twente, and although it has changed since then, the figures suggest that activities that are developing innovations (ICT, manufacturing, and R&D services) account for over one-quarter of all employment. Although not emerging in this survey, the

Deloitte's Fastest Fifty for Benelux highlights that there is some high-technology growth potential in *Kennispark* companies. Although accounting for less than 3% of the Benelux Labour market, *Kennispark* firms have consistently been visible in this ranking, with 2 entries in 2011, 4 in 2008 and 2010 and five entries, including the winner, Service 2 Media, in 2009. This suggests that it is important not to dismiss entirely the employment created on *Kennispark* as being in support services rather than high technology businesses.

**Service Provision.** The data on service use from the survey makes two main points. Firstly, the correlation coefficients suggest that firms are using the services that they need, which suggests that the service offer is functioning effectively. A question can be here raised about whether the mix of firms is entirely desirable, and a different mix of firms more oriented towards rapid growth would demand other services, but this balance is suggestive of a functioning innovation ecosystem. The second point is that the university forms part of the rationale for these services in terms of accessing talent and laboratories. Clearly, not all the requirements of innovating businesses are for university knowledge, and there are a series of far more practical needs such as finance and accommodation. But the importance of the university to the firms' business support needs, and the use of the university to meet those needs, further suggests that there are productive interactions between firm and university.

**Innovation.** The data on sources of knowledge in the innovation process was deliberately light-touch and does not allow the nuances of the rationales for the use of the knowledge, and its value to the firms to be teased out. The figure simply suggests that as well as being located next to the university, and the university being an important source of talent (in terms of graduates and trainees), the university is also supporting these firms' innovation processes through knowledge provision. This further points to a reality of connected and interacting businesses and universities around *Kennispark*, although the density and sustainability of those relationships is not directly visible in this research.

#### *The strategic fit of the political and economic realities of Kennispark*

There is a question here concerning the strategic fit of the political and the economic realities of the *Kennispark* project. At the highest level, there is an intuitive feel that *Kennispark* is not meeting the ambitious aims that were set by project partners, particularly around the creation of a new district, and in particular a district fulfilling a role not previously present in the Twente region. The results are at first sight somewhat unimpressive – although the region might have wished to have styled itself as the 'Silicon Valley on the Dinkel' (the main river in

Enschede, *cf.* Benneworth & Hospers, 2007), the reality remains more prosaic of a stepwise and almost organic growth rather than a chaotic explosion suggested by some of the policy rhetoric. This suggests that the *Kennispark* project might be regarded as a failure precisely because of this mismatch between the ambitious policy projections and the more mundane reality. But what is perhaps surprising is the continued support for *Kennispark* at a high political level, suggesting that there is a degree of correspondence, and economic outcomes fit with local policy-makers and funders<sup>1</sup>.

The first area where we would expect to see a degree of concordance is in terms of job concentration, which is a clearly articulated goal of the project, with both a specific time frame (2020) and job number (10,000 new jobs). But what is perhaps remarkable here is that there is a very high degree of ambiguity in that seemingly hard target. The 10,000 figure could potentially include existing jobs, jobs relocated from elsewhere and the university rather than the 10,000 new jobs that the rhetoric about dynamism and creativity suggests. What does seem clear is that a key issue for the successful delivery in some form of this target will be the creation of middle-sized enterprises, employing over 100 people, as these are implicitly important within the strategy documents as well as important to delivering real job concentration benefits.

This issue of ambiguity is also evident in the area of the high-technology business benefits which the *Kennispark* is expected to bring. In a sense, that reflects the current reality of the blurring of high-technology as traditionally defined in terms of manufacturing, and service provision around R&D and IT services which nevertheless produce scalable services (such as computer apps<sup>6</sup> which are more a virtual product than a service. Once the definition has been broadened to include knowledge-based service companies, then clearly in terms of the criteria for fast-growing, technology-based businesses. The strategic partners can take heart from the fact that, *Kennispark* is well represented in the landscape of fast-growing Dutch technology businesses in the Deloitte Fastest 50. What is absent here are the new R&D businesses and high-value manufacturing activities to which the strategy attaches much importance, and therefore this is one area in which tensions might potentially arise in the future between partners.

The provision of services is at the heart of what the *Kennispark* organisation formally does, taking over activities previously run by other organisations, notably the university. Yet, the survey suggests that the overall/ aggregate service provision is relatively indirect, and it is principally targeted at one of the groups, the early start-ups rather than the growing



technology businesses firms or R&D and high value manufacturing firms attracted from elsewhere. At the same time, there appears to be a degree of satisfaction by the users of the quality of the services, and access to talent and the UT are important services that users value. This suggests that the value placed by politicians on *Kennispark* as a providers of services arises more because it is not a problem and businesses are not complaining rather than in having an ambition for it to be delivering a comprehensive suite of services for all of the kinds of potential firms that would be desired on the park.

In terms of innovation activity, the reality is that not all the firms on the *Kennispark* are innovating, but for those that are there has been a link back to the university in the last year. At the same time, the strategic rhetoric emerging from the *Kennispark* partners conjures up images of a knowledge café effect of creative entrepreneurs, staff and students mingling socially and developing exciting new products. Again, the reality is of a more routine and focused set of incidental relationships embedded within well-managed research and innovation processes – (something which although our survey did not explore it, has been documented elsewhere *cf. inter alia* Zomer *et al.*, 2010). What is striking is the relatively large numbers of firms reporting linkages to the university, and a form of satisfaction with those connections, suggesting that there is a reality of some kind of network between the university and *Kennispark* firms, even if not the creative milieu alluded to by policy makers.

### **STRATEGIC AMBIGUITY AND THE ‘BIG PROJECT’: OLD HIGH-TECHNOLOGY FANTASIES IN NEW BOTTLES?**

Our overarching research question in this been has been is whether it is possible for urban policy to purposively create an central knowledge district – when the scope of urban policy is necessarily limited to the urban locality. In this regard, we have focused on the issue of mobilising a coalition of partners interested in creating a district, and the dynamics of sustaining that partnership which can build an effective district that meets both policy-makers’ needs as well as the wider anticipated benefits. To address this, we asked four operational research questions and presented the evidence to analyse them in the preceding sections. The three questions related to the science park benefits desired by strategic partnerships, delivered in practice and their strategic fit.

From the preceding analysis, there are a number of features which appear to be significant in this process, and which provide an insight into the way that strategic fit is operating. The first point is that there does appear to be a degree of satisfaction by policy-makers in what

*Kennispark* is delivering, and on that basis we infer that there is indeed a degree of strategic fit in practice. But at the same time, we also note a curious mismatch between the way that these science park benefits are articulated, between a big strategic vision and the much smaller economic reality. At the outset there has been an assumption that the strategic fit has to be an agreement, but that strategic fit has arisen despite failing to fulfil the (in all likelihood impossible) aspirations that partners have for the science park. This seems to raise the rather more interesting possibility that this strategic fit might be a result of the mismatch, or to put it another way, the strategic partners have some kind of cognitive dissonance between their aspirations for the vision and their acceptance of the reality.

It is this interesting and admittedly rather speculative point which we believe forms the basis for the contribution made by that paper, and that is to raise the possibility that projects may have strategic visions which partners implicitly accept or subconsciously know will never be fulfilled. Furthermore, it raises the possibility that this dissonance might be a positive factor that helps to build support for the projects, and helps them to be implemented in practice. This is not a totally unknown phenomenon in spatial planning, where big ideas and alluring visions are used to mobilise a community to deliver difficult projects. But what is novel in this case is the detail of the strategic targets set and the fact that a failure to be progressing to deliver these targets does not detract from the projects being valued by strategic partners, as we have seen in the case of *Kennispark*. This phenomenon, if found replicated more widely, would provide an interesting basis for beginning to challenge the rationalism which now dominates strategic planning concepts but which fails to deal with how real strategy-makers deal with future uncertainty.

This is not an unknown phenomenon in the strategic management literature found in business studies, exploring how companies deal with innovation processes that create possibilities that might eventually destroy their existing business models. Van der Ven *et al.* (1999) for example highlight the stages of what they term an innovation journey which are initiated with the mobilisation of a ‘terrifying idea’ that is only slowly revealed to the world as its shortcomings are wrinkled out. In this case, the early stages are characterised by bringing together a team ‘in secret’ to develop the idea and condition a natural supporter community before it is exposed to criticism. But what has happened in this case is that these impressive ambitions have been revealed in public, and yet have not faced substantial criticism despite the evident details in their realisation.

Isenberg (2010) offers the idea of a “Big Idea” as a means of spontaneously creating innovative ecosystems within companies to deal with precisely this problem of radical technologies, creating mass mobilisations of innovation stakeholders in what he refers to as an ‘entrepreneurial revolution’, again activating those with the resources necessary to deliver success without raising resistance to the project. There is a necessity for shaping the entrepreneurial ecosystem around local conditions and strengths in terms of industries (Isenberg, 2010, p. 43). The ultimate aim is a success but the conditions of that success do not need to be stated *ex ante*: what is important is in initiating the change process to help steer and stimulate existing actors rather than attempting to build big solutions *de novo*.

This has interesting implications for trying to make sense of the plethora of ambitious plans for science cities and indeed the notion of the rise of the ‘central knowledge district’ as a new distinct urban form and planning repertoire. The central message that is suggested by this study is the need for caution in assuming that strategic planners who express ambitions for creating these new knowledge districts really have that ambition. There are of course many successful new knowledge districts emerging, as detailed in the other papers in this special issue, and strategic partners would not be averse to enjoying some of that success. But that is not to say that the purpose of urban knowledge-based development strategies attempting is really to create those districts. These strategies may be themselves strategic manoeuvres or finessing tactics to address other kinds of urban development problems which are obscured by framing the problem and its solution in the language of urban science. It is those problems and dynamics which could usefully benefit from further study in order to better understand urban development trajectories and the most appropriate policies in the emerging knowledge economy.

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Table 1. Science cities: an international comparison

	Science cities	Daedeok	Silicon Valley	Zhong-guancun Science Park	Hsinchu Science Park	Tsukuba	Kista	Oulu
	United Kingdom <sup>1</sup>	Korea	United States	China	Chinese Taipei	Japan	Sweden	Finland
Green-field location		●	○		●	●		
Regional development goals	●	●			●	●		●
Dominant national role		●		●	●	●	●	
Dedicated public investment		●		●	●	●	●	
National programme	○				●			
Major research institutions	●	●	●	●	●	●	●	●
National R&D leader			●	●		●	●	
Partnership models	●		○		●		●	●
Flexible network models	○		●	○	○		○	○
Orientation to innovation	●	●	●	●	●	○	●	●
"New Argonaut" links			●	●	●			
Strong venture capital presence			●					
Public science education	●							

Notes: 1) Northern England Science Cities of Manchester, Newcastle, York; 2) ● = Strongly present; ○ = partially present. More ●s or ○s denotes that more factors are present, not that more factors lead directly to better outcomes.

Source: OECD (2008), *OECD Reviews of Regional Innovation: North of England, United Kingdom*, OECD Publishing, Paris, doi: 10.1787/9789264048942-en based on analysis by Dr. Phil Shapira for the OECD.



*Table 2* Different actors and their goals/ interests in strategic urban science

<b>Actor</b>	<b>Goals/ interests</b>	<b>Indicators of success</b>
Regional government	Successful projects; legitimacy, electoral success	A flagship new district that attracts highly talented individuals
Universities	Research infrastructure, research income	New buildings which help them to attract talented faculty/ students
Community groups	Regeneration, better local facilities	‘Footfall’: bringing people into local area raising public service demands
Residents	Improved employment in emerging sectors	All the benefits and none of the costs of a knowledge workers districts
Real estate firms	Profitable rental locations, development opportunities	Density within the developed area as indicator of prestige
High tech firms	Competitive locations with skill-base.	Ease of access to support services via prestigious address

*Source after Benneworth et al. (2011)*

*Table 3 Distribution of employment in the Kennispark firms*

<b>Category</b>	<b>Number of Firms</b>	<b>%</b>	<b>Cumulative %</b>
0	141	32,6%	32,6%
1	113	26,1%	58,7%
2-3	60	13,9%	72,5%
4-5	12	2,8%	75,3%
6-10	41	9,5%	84,8%
11-20	26	6,0%	90,8%
21-50	23	5,3%	96,1%
51-250	15	3,5%	99,5%
>250	2	0,5%	100,0%

*Table 4 Technology intensity of Kennispark firms, number of firms and total employment*

	Category	#	%	Total Employees
Technology intensity	High technology	7	1.6	57
	Medium high-technology	3	0.6	5
	Low-medium technology	7	1.6	60
	Low-technology	6	1.2	36
	Others	428	95.0	5898
Knowledge based services	Knowledge based services	320	73.9	5283
	Less-knowledge based services	85	19.7	597
	Others	26	5.3	176

*Source: authors' own analysis of CoC data.*

*Table 5 The top five services demanded and used by Kennispark innovators*

<b>Top 5 by demand</b>	<b>%</b>	<b>Top 5 by use</b>	<b>%</b>
Talent from UT	63%	Talent from UT	52%
Office Space	48%	Parking	28%
Parking Facilities	40%	Office space	32%
Eating facilities	40%	Eating facilities	31%
Access to Laboratories	26%	Access to Laboratories	11%

Table 6 Rank correlations per service

Need vs Use	Mean Need	Mean Use	Spearman's Rho
Office space	3.31	2.87	0.778**
Sport facilities	2.21	1.67	0.575**
Parking	3.13	3.02	0.655**
Eating facilities	3.10	2.94	0.384**
Coaching	2.54	1.75	0.488**
Laboratories	2.17	1.75	0.811**
Kennisvraag	2.29	1.62	0.621**
Joint venture facilitation	2.40	1.44	0.458**
Kennispark business development team	2.42	1.48	0.542**
Entrepreneurial training	2.69	1.67	0.326*
Financial support	2.33	1.67	0.618**
Kennispark events	2.62	2.25	0.612**
Talent from the UT	3.71	3.33	0.741**
* $p < 0.05$			
** $p < 0.01$			
N=52			

Table 7 Sources of innovation

<b>Sources of Innovation</b>	<b>Not used</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>	<b>Mean</b>	<b>S.D</b>
Internal	0	0	7	31	3,82	0,393
Suppliers	6	5	16	11	2,84	1,027
Clients	1	4	15	18	3,32	0,775
Competitors	5	13	18	2	2,45	0,795
Consultants	14	11	9	4	2,08	1,024
University of Twente	9	8	11	10	2,58	1,13
Conferences and trade fairs	10	10	14	4	2,32	0,989
Scientific publications	11	8	11	8	2,42	1,13
Professional associations	17	11	8	2	1,87	0,935

N=38

Table 4 *Kennispark* Fastest 50 companies by year 2008-11.

2011

Service 2 media 11

Symbol BV 24

2010

Service 2 media 1

ODS2 5

Xsens Technology 42

TSI Solutions 48

2009

Squills 7

TSI Solutions 8

ODS2 14

Bizz Design Academy 22

Xsens Technologies 30

2008

Squills 4

TSI Solutions 18

Xsens Technologies 35

Fortes Solutions 42

Figure 1 The location of the region of Twente in Europe.





*Figure 2 The Kennispark concept at the time of the economic crisis, c. 2004*

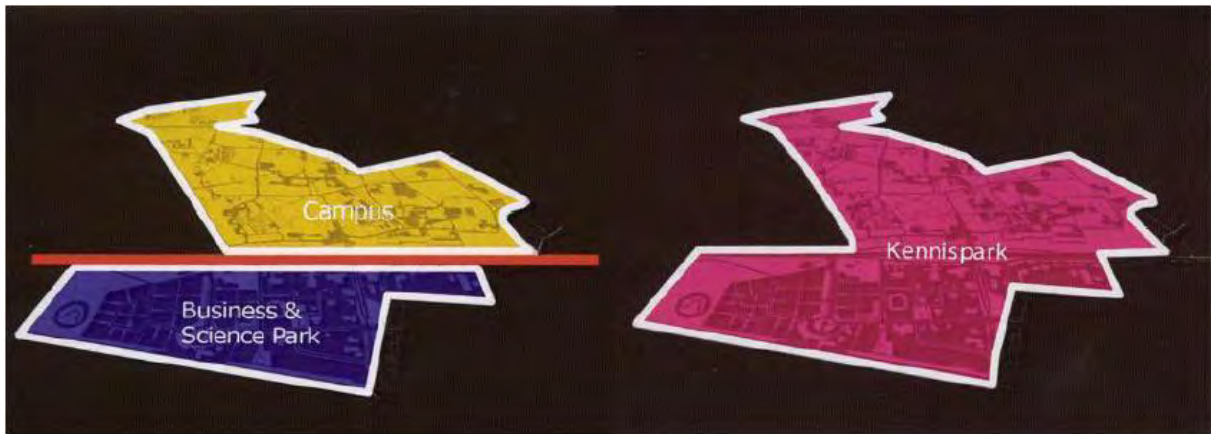
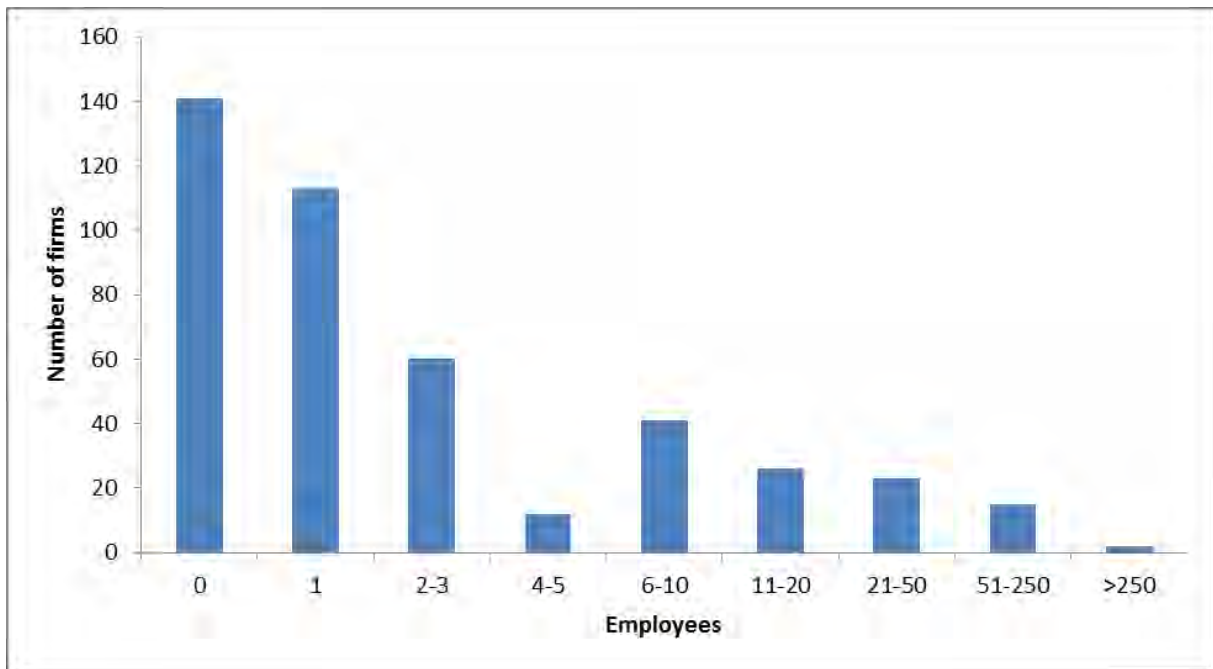
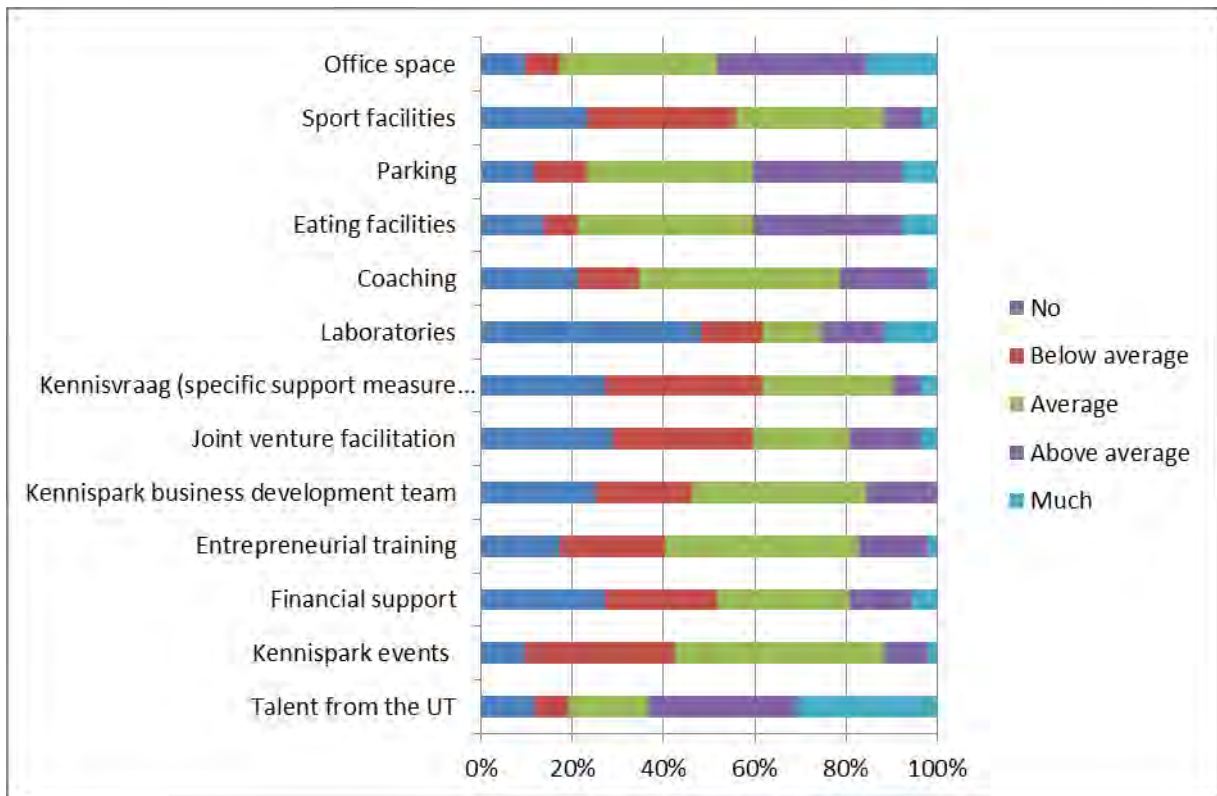


Figure 3 Employment at Kennispark by number of employees in companies.



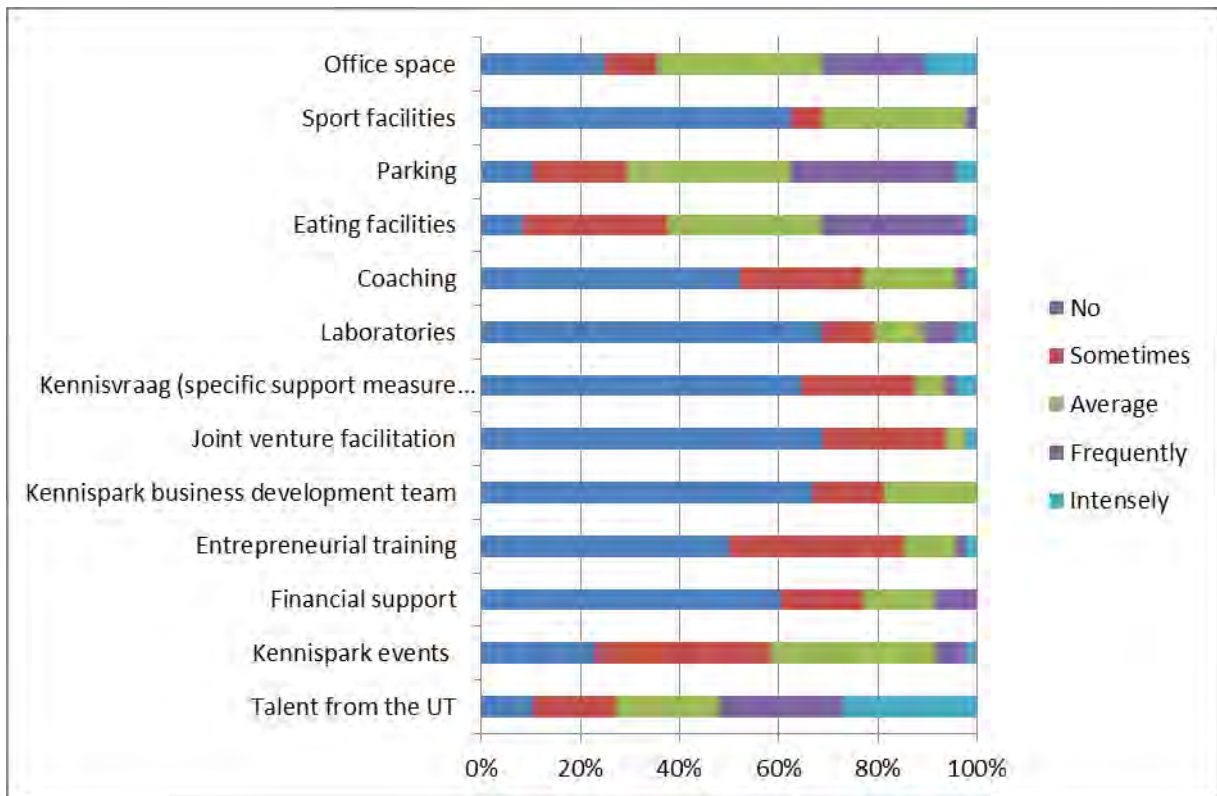
Source: authors' own analysis of CoC data.

Figure 4 Reported need for services provided by Kennispark



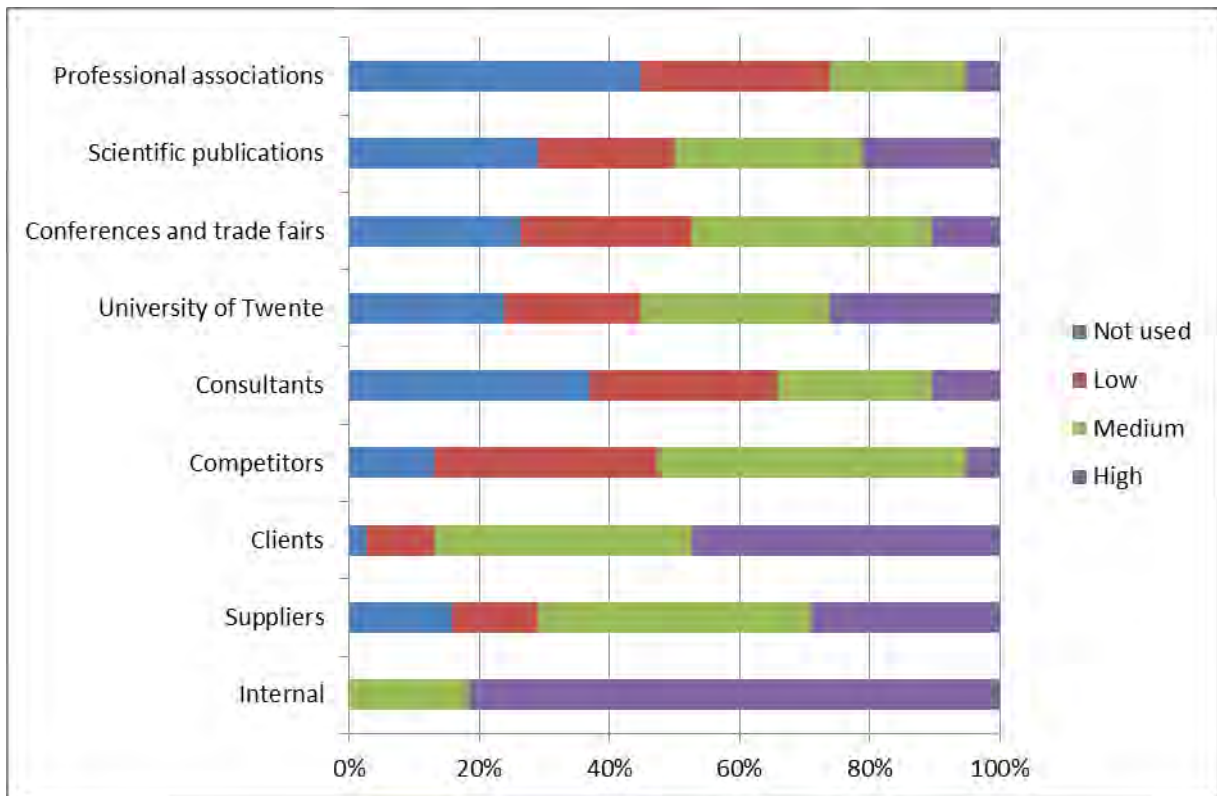
(N=52)

Figure 5 Reported use of services provided by Kennispark



(N=52)

Figure 6 Significant sources of knowledge reported by innovating firms



(N=38)

<sup>i</sup> A good example of this would be in the Mayor of Enschede's 2011 New Year speech where he placed *Kennispark* central to the ambitions for the economic recover of Enschede and the region. As well as being Mayor of Twente, Den Oudsten was also chair of the Regional Economic Partnership, *Regio Twente*.

—Sustainaly strengthening its economic is urgent for Twente. Our economy is relatively weak and has long-term problems of high unemployment and labour market mismatch. There are several pathways we are following to stimulate this recovery, of which I name two.

—Twente is going to grow into an international knowledge region. Enschede has the distinction of being an entrepreneurial knowledge city that knows how to transcend its own boundaries. The heart of this city is being formed by *Kennispark*. The *Kennispark* is a very promising development that is steadily leading towards a highly interesting innovative impulse where new firms are primarily developing and bringing to market technology based products. This is already creating significant employment. The University of Twente, this year fifty years old, the Saxion Polytechnic, Province and City are working on this tin intensive partnership.

<http://www.tctubantia.nl/regio/enschede-haaksbergen/7903652/Nieuwjaarsspeech-Den-Oudsten.ece>. Viewed 31 January 2012, authors' own translation..