Developing successful Innovation Districts

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Colophon

Developing successful Innovation Districts

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PERSONAL NOTE

I started studying with the perception of becoming an architect. Then I started my journey in Delft and it brought me somehow to where I am now. The following 10.000 words will bring me one step closer to the end of this journey as a student. During the last 7 years my interest in designing for the built environment shifted its focus from a spatial level towards a more strategic and management level. It brought me closer to practice and showed me that you can be creative in so many more ways.

With my final research I hope to enrich our academic field with a grasp of knowledge and findings on a topic that stole my interest during my internship at the Port of Rotterdam Authority. I worked in close collaboration with the municipality on Rotterdam on several projects in the Merwe-Vierhavens. An area marked by its former industrial functions, still present harbour activities and by the hidden creative pioneers throughout the area. An appealing mix of functions for some, like me, but still unloved by many.

This area is been subject of research for a long time, also at our university. Because of its complexity when it comes to urban planning. The Merwe-Vierhavens struggles with its position between harbour and city while that very position also defines its potential for Rotterdam to entangle this rather unproductive area with the city. Rotterdam is facing the transition towards new energy, new economy (Rifkin), and a growing housing shortage. Altogether a very dynamic context when it comes to urban planning. This arouse my interest for further exploration.

This research will give me the opportunity to see how urban planning, stakeholder involvement and concrete projects are managed and realized in different political and spatial contexts in relation to the topic of innovation districts that needs a systematic analysis to get hold on the distinctive typologies and several levels of formal planning that have emerged over the last 15 years for the urban trend that transformed into an new urban model.

The research proposal I will present you in this report will provide some insight in what my final graduation thesis is about and how I am going to carry out the study needed to answer my research questions. Before reading I would like to thank everyone who has contributed to this research so far. Especially, Tom Daamen, Erwin Heurkens and Alexandra den Heijer for their guidance and Maike Akkers and Rik Dalmeijer for the opportunity to carry out this research under the wings of the Port of Rotterdam Authority N.V and Stadshavens Rotterdam.

Marissa van der Veer
Delft, 2016
SUMMARY

22 Barcelona and South Boston Riverfront were the first official innovation districts and leading examples for Rotterdam. They can be seen as a product of urban experimentation, and of a convergence of several urban theories. They can be defined as top-down urban strategies in which different layers of innovation interact. Through strong leadership and guidance, with the ultimate objective of strengthening the location’s competitiveness, this multi-dimensional model of innovation can be transformed into a self-reinforcing and self-sustaining innovation ecosystem (Morisson, 2014).

However, Katz and Wagner believe that innovation districts can also emerge from bottom-up leadership. They see distinctive typologies and several levels of formal planning emerge to facilitate ‘open innovation’ (Katz & Wagner, 2014).

Unfortunately the concept of innovation districts became a popularized concept, because of its proven mainly economic success, and has been applied to many American and European neighbourhoods ever since. Most often the concept was only used as a buzzword to rebrand a rundown neighbourhood and therefore became an innovation district only in name as branding initiative (Morisson, 2015).

Last year, in 2015, the municipality of Rotterdam and the Port of Rotterdam Authority launched the Rotterdam Innovation District under the wings of the Stadshavens Rotterdam programme. Stadshavens Rotterdam is facing several challenges in translating the Merwe-Vierhavens and RDM into a successful innovation district.

In essence, successful innovation districts are built on several sophisticated layers of innovation and form a synergy between economic, spatial, and network assets. Leadership, bottom-up or top-down, is essential to translate this, mostly ‘copy-paste’ urban strategy, into an area responsive to market-forces, open for organic growth and able to spur innovation so that these districts become more than just a label for international attention.

To advise cities in realising an innovation district not only as branding initiative this research will provide insights into how innovation districts – initiated as urban strategy – can be used to create successful innovation ecosystems that spur innovation. Besides that it also formulates specific recommendations on how Rotterdam can apply these lessons in the realisation of the Rotterdam Innovation District.

**Keywords:** innovation districts | urban strategies | branding initiative | successful innovation ecosystems
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CHAPTER 1
INTRODUCTION

1.1 PROBLEM FIELD

To construct a thorough problem definition this chapter will first elaborate on the problem field by exploring the concept of innovation districts, followed by two conceptual models by Morisson and Katz & Wagner and concluded with a working definition on successful innovation districts. After that the case of Rotterdam, as motive for this graduation thesis, will be clarified.

The concept of Innovation Districts

When exploring the success factors of innovation districts the first most pressing question is: What is an innovation district? And more broadly, what is innovation?

Through literature review a definition for innovation was constructed as:

the application of technology and knowledge in order to develop new ideas, products, services, technologies, or processes that have the potential to create new market demand or be socially, economic, or scientifically transformative.

An innovation district should therefore at least be a place in which people and resources are concentrated in such a way that they spur innovation through exchange of knowledge and collaborate on ideas in new and unexpected ways. Developing this type of environments successfully turns out to be more complex than it may seem on first site. Innovation districts are more than just geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators and accelerators.

Instead, innovation districts are a recent trend and lacking systematic analysis (Katz & Wagner, 2014), have a multi-dimensional nature and counts multiple goals (Pressure cooker, 2016; Morisson, 2015; Katz & Wagner, 2014; Glaeser, 2009; Clark, 2010); combine many different urban theories ranging from Marshall’s ideas on the industrial district, to Jacobs’ urban theories on mixed use within the city, to Porter’s cluster theory on economic competitiveness and locational advantages, to Leydesdorff and Etzkowitz’s Triple Helix model on innovation, and to Florida’s creative class (Morisson, 2014); and are emerging in a wide variety of distinctive types throughout the world of which some only become innovation districts in name as branding initiative (Katz and Wagner, 2014; Morisson, 2015).
Cities are being re-appreciated; in need for sustainable economic growth; want to speed up the transition towards a knowledge-based economy; and wish to become more competitive through strengthening its innovative capacity. Besides that the geography of innovation is changing because of new productive conditions that are emerging from globalization and advances in ICT. As reaction, a recent trend in urban planning has emerged as a new urban model named innovation districts. (Stadshavens Rotterdam 2015; Morisson, 2015; Katz & Wagner, 2014; Talkington, 2014; Clark, 2010).

<table>
<thead>
<tr>
<th>TRADITIONAL INNOVATION SPACES</th>
<th>INNOVATION DISTRICTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>main access:</strong></td>
<td>car</td>
</tr>
<tr>
<td><strong>typology:</strong></td>
<td>spatially isolated</td>
</tr>
<tr>
<td><strong>lay-out:</strong></td>
<td>campus</td>
</tr>
<tr>
<td><strong>functions:</strong></td>
<td>mainly research or commercial</td>
</tr>
<tr>
<td><strong>sites:</strong></td>
<td>green fields</td>
</tr>
</tbody>
</table>

Table 1. Comparison of traditional innovation spaces and Innovation Districts.
Based on Katz & Wanger (2014).

<table>
<thead>
<tr>
<th>JOBS</th>
<th>+ 5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>30% in the technology sector</td>
<td></td>
</tr>
<tr>
<td>21% in the creative industries</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEW COMPANIES</th>
<th>+ 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% in education and non-profit sectors</td>
<td></td>
</tr>
<tr>
<td>40% incubators</td>
<td></td>
</tr>
<tr>
<td>co-workers</td>
<td>shared space</td>
</tr>
</tbody>
</table>

| START-UPS | + 1200 |
| RENTS | + 43% |

Table 2. Measuring Boston’s Innovation District economic success.
Based on Ross (2014).

Developments like the Boston Innovation District made innovation districts a popular concept and therefore many cities have tried to ‘copy-paste’ or at least remake these successful environments (Morisson, 2015). Mayors across the globe have replicated variations of the Boston and Barcelona models – first officially branded innovation districts – in their own cities. As a result, there are already over 80 ‘official’ innovation districts worldwide (Talkington, 2014) and cities are still making way for innovation zones especially for clustering entrepreneurs, start-ups, business accelerators and incubators (figure 1).
Innovation districts are emerging in a wide variety of distinctive types throughout the world (Katz & Wagner, 2014) and some only become innovation districts in name as branding initiative (Katz and Wagner, 2014; Morisson, 2015) because there is no one-size-fits-all innovation district model. Innovation districts remain non-cookie-cutter developments as they differ in typology; economic, spatial and networking assets (Katz and Wagner, 2014); in leadership and their refinement in layers of innovation (Morisson, 2015) and in the cities’ main objectives for (re-)developing these districts (Katz and Wagner, 2014; Morisson, 2014).

Cities can, for instance, have the ambition to use the concept of innovation districts to speed up the transition towards a knowledge-based economy; stimulate sustainable economic growth; strengthening cities’ competitiveness; or rebrand their city internationally. On a more local scale cities can use the concept of innovation districts to attract, create or retain human capital, creative entrepreneurs and innovative companies; revitalize an unproductive part of the city; and strengthen locational advantages through the output of innovative products and services to become or remain an innovation hub (Pressure cooker, 2016; Morisson, 2015; Katz & Wagner, 2014; Glaeser, 2009; Clark 2010).

**Drivers of innovation districts**

But innovation districts are not always planned as top-down urban strategies to achieve goals imposed by the city as in Boston and Barcelona. They have emerged as an imitation of successful urban milieus like Silicon Alley in New York, Cambridge in Massachusetts, and in Paris’ Silicon Sentier in which spontaneous growth was achieved through market forces without any formal planning (Morisson, 2015). Besides the city or spontaneous market forces the development of innovation districts can also be led by major corporate investments in which the private sector actively takes the lead in initiating this new urban model (University of Pennsylvania, 2015).

*Figure 1. Examples of Innovation Districts worldwide.*

Based on: Position Paper RId (2015). Own figure
Innovation districts can therefore be categorized in:

- **Top-down urban strategy** | government planning
- **Private sector-led** | (corporate) bottom-up leadership
- **Organic growth** | market forces-responsive

Public of private actors like the mayor’s office and the local government, real estate developers and major land owners, but also companies and innovative entrepreneurs or universities can be seen as drivers of innovation districts (Katz and Wagner, 2014).

The mayor’s office and the municipal departments are the primary instigator in deciding to create an innovation district when we look at Barcelona, Boston, Medellin and Singapore (Morisson, 2015). These districts are driven by strong visions of mayors like Tom Menino and Joan Clos to realise something new and unconventional. Real Estate actors like major landowners, real estate developers and investors are driven by profit and feasible business cases so when the benefits exceed the costs commitment on unconventional thinking and an active participation in developing these districts can be achieved (Morisson, 2015). Private firms and innovative entrepreneurs, on the other hand, want to attract and retain the best employees and impulse innovation.

<table>
<thead>
<tr>
<th>DRIVER</th>
<th>WHO</th>
<th>CASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mayors and local governments</td>
<td>Mayor Tom Menino Mayor Joan Clos City government</td>
<td>Boston Barcelona Stockholm Medellin Singapore</td>
</tr>
<tr>
<td>Major real estate developers and major land owners</td>
<td>Vulcan Real Estate Brooklyn Navy Yard</td>
<td>Seattle New York</td>
</tr>
<tr>
<td>Philanthropic investors</td>
<td>New Economy Initiative Kresge Foundation Danforth Foundation</td>
<td>Detroit Detroit St. Louis</td>
</tr>
<tr>
<td>Managers of research campuses</td>
<td>Triangle Park Foundation Texas Medical Centre</td>
<td>Houston</td>
</tr>
<tr>
<td>Anchor companies</td>
<td>Quicken Loans Comcast Amazon</td>
<td>Detroit Philadelphia Seattle</td>
</tr>
<tr>
<td>Advanced research institutions</td>
<td>Washington University Carnegie Mellon Drexel University MIT</td>
<td>St. Louis Pittsburgh Philadelphia Cambridge</td>
</tr>
<tr>
<td>Advanced medical campuses</td>
<td>Henry Ford Health System University of Pittsburgh Medical Centre</td>
<td>Detroit Pittsburgh</td>
</tr>
<tr>
<td>Incubators, accelerators, economic cultivators</td>
<td>Barcelona Activa Cambridge Innovation Centre BioGenerator</td>
<td>Barcelona Cambridge St. Louis</td>
</tr>
<tr>
<td>Social networking programmers</td>
<td>Venture Café Foundation High tech Campus</td>
<td>Boston &amp; Cambridge Eindhoven</td>
</tr>
</tbody>
</table>

Table 3. Drivers of Innovation Districts. Based on Katz & Wagner (2014). Own table
The role of universities

Another import driver is the involvement of knowledge institutions. Universities play a pivotal role in the success of innovation districts because they provide fuel for innovations with future entrepreneurs, talented graduates, entrepreneurial professors, and seed capital for start-ups (Morisson, 2014).

Research institutions and universities have been central in fostering innovation, driving growth in cities and are becoming more important, both in terms of economic output and employment numbers (Hanna, 2016). This changes the role of universities in society from a traditional factory of knowledge (Huxley, 1890) focused on training students and producing basic and applied knowledge towards a knowledge hub that advances technological innovation and economic development in which universities compete as private institutions and generate knowledge useful for the local economic strategy (OECD, 1998; Youtie, 2008).

In this new role universities are becoming even more deeply embedded in innovation systems, seeking to actively foster interactions and spill-overs; to link research with application and commercialization; and taking on roles of catalysing and animating economic and social development (Siegel, 2003; Youtie, 2008). Therefore universities are particularly helpful in driving the growth of innovation districts and making them successful (Katz and Wagner, 2014).

In the context of the knowledge-based economy, which relies heavily on competitive and collaborative relationships, it is not just the agglomeration of skilled workers that is important, but the interactions and ties between them. Universities and public or civic institutions play an important role in shaping these networks, and forging links between individuals and businesses.
These networks are important not just in the sharing of ideas and collaboration between firms, but also in generating networks of social capital (Saxenian, 1994; Katz and Brandley, 2014).

When we look, for example, at MIT in Boston and Stanford University in San Francisco both universities played a critical role in the development of the two regions in terms of their innovative capacity. Because these universities had a strong linkages with private companies, the government provided suitable policies to foster innovation, and because of the presence of these well-established, top-ranked research universities and complementary assets for commercialization these regions were able to produce successful innovation districts (Saxenian, 1994; Leydesdorff and Etzkowitz, 1996).

The “Triple Helix” model for innovation emerged from the evolving role of universities, the nature of knowledge hubs like Silicon Valley (San Francisco) and Route 128 (Boston), and the new role of governments and institutions. It shows the collaboration between universities, industries and government in which all parties collaborate to foster innovation and create wealth by realising a sustainable innovative ecosystem (Etzkowitz & Leydesdorff, 2000).

To create a successful innovation district universities and research institutions should therefore be involved in the planning of innovation districts and at best be present in the district itself (Morisson, 2015). Unfortunately many districts do not originally include universities, especially in the typology of re-imagines urban areas (Katz and Wagner, 2014).

*Urban lay-out*

University can be embedded in the urban fabric of a city due to long-established university buildings and institutions within the city and by sharing a wide range of facilities between students, researchers and the general public. But universities and institutions can also locate closer to a critical mass of companies and creating a cluster in which some facilities are shared. A third option is the concept of a campus, an urban enclave quite detached from their urban environment and focussed on knowledge-intensive activities (Hanna, 2016).
As many districts do not originally include universities it can be challenging to integrate them within the urban lay-out of innovation districts.

Given the vast distinctions in regional economies, drivers, goals and access to knowledge, innovation districts differ markedly in form and function. This comes with the challenge how each district marshals resources in a deliberate and customized way to capitalize on advantages and realize the promise of productive, inclusive, and sustainable growth (Katz & Wagner, 2014). Nevertheless three main typologies can be recognized from case studies concerning the urban lay-out of innovation districts.

Namely:

- **anchor-plus model** embedded in the urban fabric of the city (mid-town or down town) centred around major anchor institutions
  example left: Medical Center in Houston Texas

- **re-imaged urban areas** ex-industrial urban areas in need for rebranding near historic waterfronts and industrial districts
  example middle: South Waterfront Boston

- **urbanized science parks** former isolated science and tech parks densified science parks and mixed by infusion of new facilities
  example middle: Research Triangle Park North Carolina
Only in name

Unfortunately the concept of innovation districts became a popularized concept, because of its proven mainly economy success, and has been applied to many American neighbourhoods ever since. Most often the concept was only used as a buzzword to rebrand a rundown neighbourhood and therefore became an innovation district only in name (Morisson, 2015). The intense variation in innovation districts requires practitioners to assess assets and liabilities with clear-eyed objectivity, so that growth strategies can be realistic and customized (Katz and Wagner, 2014).

Morisson vs Katz and Wagner

Two main contributors on the subject of innovation districts are Arnault Morisson and Bruce Katz. Both developed a conceptual framework to explain the concept of innovation districts and made a first attempt to define their success factors.

According Morisson, innovation districts build on many different urban theories ranging from Marshall’s ideas on the industrial district, to Jacobs’ urban theories on mixed use within the city, to Porter’s cluster theory on economic competitiveness and locational advantages, to Leydesdorff and Etzkowitz’s Triple Helix model on innovation, and to Florida’s creative class. These districts are, most of the time not a spontaneous occurrence, but mainly initiated as top-down urban strategies endorsed by municipal leadership in which urban theories are combined and translated into layers of innovation that interact and are coordinated by strong leadership to mainly strengthen the location’s competitiveness (Morisson, 2014).

Figure 5. The Innovation District Framework. Source: Morisson (2014)
Leadership is seen as a central characteristic for developing an innovation district and to fully transform them into self-reinforcing and self-sustaining innovation ecosystems because leadership guides the development of each subsequent layer of innovation. The different layers of innovation interact among each other which represents the innovative capacity of the district and can be conceptualized in the ‘Innovation District Diamond’ (Morisson, 2014).

This framework (figure 6) can be applied to one simple company to conceptualize its innovative capacity but is also can be applied on the whole district. Through strong leadership the different layers of innovation can be upgraded which results in a higher innovative capacity and conceptually in a more sophisticated diamond. To foster innovation these top-down planned innovation districts must be open and grow organically. However to realise these untraditional urban projects negotiations and cities’ leadership is necessary (Morisson, 2015).

Katz and Bradley believe that innovation districts can also emerge from bottom-up leadership. They see distinctive typologies and several levels of formal planning emerge to facilitate ‘open innovation’ (Katz & Wagner, 2014). But even though the form and function of innovation districts differ markedly Katz and Wagner defined three returning type of assets: economic, physical and network assets. These assets combined with a supportive, risk-taking culture can create the right innovation eco-system. According Brookings this means: a synergistic relationship between people, firms and place that facilitates idea generation and accelerates commercialization.
In this conceptual model the distinctive assets stand for:

- **Economic assets**: the firms, institutions and organizations that drive, cultivate or support an innovation-rich environment.
- **Physical assets**: the public and privately-owned spaces — buildings, open spaces, streets and other infrastructure — designed and organized to stimulate new and higher levels of connectivity, collaboration, and innovation.
- **Networking assets**: the relationships between actors — such as between individuals, firms, and institutions — that have the potential to generate, sharpen, and accelerate the advancement of ideas.

Katz and Wagner believe that this trend, with an extensive focus on creating a dynamic physical realm that strengthens proximity and knowledge spill-overs, has the unique potential to spur productive, inclusive, and sustainable economic developments.

### Successful innovation districts

The processes defined by Morisson and the assets mentioned by Katz are seen as ingredients to spur innovation. These processes and assets can be easily found in any city; however to which extent they deliver an actual successful innovation district depends on how all these aspects interact; to which extent they are present and their level of refinement. As a result, inefficiencies resulting from a lack of coordination undermine the process of innovation (Morisson, 2015). Many assume that innovation districts accelerate the process of innovation but that does not mean that they always deliver on this objective. This research tries to construct key indicators and lessons from practice to actually define and steer upon the success of innovation districts.

A working definition on a successful innovation district based on literature review and case explorations is:

**A successful innovation district is a district in which all layers of innovation are present and interact and a synergy between economic, spatial, and networks is accomplished; all through leadership that can transform an artificial innovation district – initiated as urban strategy – into a self-sustaining innovation eco-system – responsive to market-forces and open for organic growth that spurs innovation.**

There are some prerequisites that need to be present in order for innovation districts to accelerate the process of innovation (Katz and Wagner, 2014; Morisson, 2015):

- Create an independent collaborative organization to develop the district;
- Secure independent funding to kick-start the development;
- Create critical mass of human capital to foster knowledge-intensive activities;
- Complete, well-integrate the layers of innovation and keep up-to-date;
- Be resilient and open to change and enhance new concepts.
The city needs to show commitment to the innovation district (Morisson, 2015) and governments should actively engage to accelerate the development of the districts by spurring innovation and entrepreneurial growth, financing land and infrastructure improvements, and boosting human capital. Besides that funding must be more reliable, predictable, and more flexible so that cities and metropolitan areas can apply the funding to the special needs of innovation districts. In essence, to realise successful innovation districts asset-rich companies, civic entities and financial institutions — with expertise honed from global experience — need to invest at scale and therefore higher levels of government also need to act with more predictability and purpose (Katz and Wagner, 2014). Also the independent organization should not be affected by local politics too much and must consist of mainly practical talented individuals which vary in expertise and are committed to the city. (Morisson, 2015).

Innovation districts must be seen as entrepreneurial ventures with a critical mass in population and wealth. A city can choose for a diversity-based development with start-ups, innovative and knowledge companies which suits best for a district between 20 and 40 hectares with a population below 750,000 inhabitants. Cluster-based developments can also be successful but can also be a risky endeavour. As innovation districts need to be relatively compact and dense, cities should think about the amount of clusters in relation to the size of the innovation district and the population (table 4).

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>GMP billions USD</th>
<th>CLUSTERS</th>
<th>SIZE DISTRICT hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 400,000</td>
<td>&gt;20</td>
<td>0</td>
<td>20-40</td>
</tr>
<tr>
<td>&gt; 750,000</td>
<td>&gt;30</td>
<td>1</td>
<td>40-60</td>
</tr>
<tr>
<td>&gt; 1,250,000</td>
<td>&gt;40</td>
<td>2</td>
<td>60-90</td>
</tr>
<tr>
<td>&gt; 2,000,000</td>
<td>&gt;55</td>
<td>3</td>
<td>90-120</td>
</tr>
<tr>
<td>&gt; 3,500,000</td>
<td>&gt;70</td>
<td>4</td>
<td>120-160</td>
</tr>
<tr>
<td>&gt; 4,000,000</td>
<td>&gt;90</td>
<td>5</td>
<td>160-200</td>
</tr>
</tbody>
</table>

Table 4. Ratio clusters, size and population city. Source: Morisson (2015). Own table

Innovation districts have to constantly reinvent themselves to become more than a common district and their initiators need to set a vision for growth and have clear key performance indicators for the innovation framework and the processes involved to monitor and evaluate the success of their innovation districts (Morisson, 2015; Katz and Wagner, 2014).

The case of Rotterdam

The Merwe-Vierhavens (M4H) is one of the older harbour areas of Rotterdam situated at the north side of the Maas. Once known as one of the largest fruit ports in the world. Since 2004 this area, as part of Stadhavens Rotterdam, is gaining attention for revitalisation. From a municipal perspective this impoverished harbour site forms one of the last expendabilities for the city at
the north bank of the Maas. Therefore the municipality would like to see this area improved with high locational advantages and urbanized (Schaeken, 2014).

The Port authority N.V., as major landowner in M4H, also has an interest in developing this area and creating a high quality business climate because a revaluation of this area will contribute to the attractiveness of Rotterdam as a whole which will strengthen the competitiveness of the port of Rotterdam with other metropolises (Schaeken, 2014). To give the redevelopment of M4H a boost the municipality of Rotterdam and the Port authority of Rotterdam N.V. have decided on developing this area together as stated in their agreement of collaboration Stadshavens (SOK addendum, 2013).

Since 2013 this partnership agreement resulted in a joint project team, the Stadshavens Rotterdam programme (Pressure cooker, 2016). A development strategy drawn up by the Stadshavens Rotterdam programme creates a point on the horizon to set common goals and ambitions for the development of M4H, according Maike Akkers, area manager M4H. In this strategy, municipality and Port authority, have a supporting or facilitating role and anticipate on concrete market initiatives. In contrast to traditional blueprints an organic urban area development approach is chosen. How to reach these common goals and ambitions is therefore not set in stone. This allows the market to participate in the revitalisation of M4H (Schaeken, 2014).

To boost this redeveloped and renew attention for the Merwe-Vierhavens the Rotterdam Innovation District – RID – was launched last year, 2015. The RID is seen as an important component of the innovation ecosystem of Rotterdam (Pressure cooker, 2016) and plays an active role in creating the right innovative business climate, speed up the transition towards a durable economy, and intends to spark urban regeneration (Stadshavens Rotterdam, 2015).

Former programme director Stadshavens Rotterdam, also addresses this essence of innovation in the position paper for the RID which was published for the launch of the RID. According Preveas the city of Rotterdam and the Port of Rotterdam are facing major challenges in the area of economic growth, smart industry and clean transport. To stimulate economic growth Rotterdam should broaden its economic profile and take advantage of its unique characteristics. The Merwe-Vierhavens and RDM-Rotterdam are appointed as unique assets that address many ingredients of an innovation ecosystem with the presence of knowledge institutions, business accelerators and an growing number of start-ups.

According former area manager at the Stadshavens Rotterdam programme, no one can be against the concept of innovation districts. An area that attracts innovative companies; tries to accelerate the transition towards the new economy and also contributes to sharpen and perform the urban redevelopment strategy for the Merwe-Vierhavens is embraced by all, also by the Port of Rotterdam Authority as major landowner within the RID. Branding the concept therefore is not the main challenge, realising commitment of key stakeholders; organizing and specifying the programme of implementation; and facilitating and realising an actual innovation ecosystem is.
Research shows that Rotterdam is facing several obstacles to reinforce its ‘innovation climate’. For instance, there is a shortage of venture capital; a lack of available talent for companies developing apace; and a physical focus point for innovation with the right density of start-ups, scale-ups and corporates is missing (Pressure cooker, 2016). Besides these obstacles, the Stadshavens Rotterdam programme is also struggling with its current collaboration model and is looking for the right balance to deal with market initiatives and react on current (economic) developments to especially follow up the launch of the RID as the RID is more than just a branding initiative and intends to spark urban regeneration as well (Stadshavens Rotterdam, 2015).

The Stadshavens Rotterdam programme has difficulties in their collaboration model because the municipality and Port Authority, in the end, represent different ambitions for city and harbour and their business culture differs in terms of decisiveness which influences their collaboration and trust. Besides that, the Stadshavens Rotterdam programme is lacking mandate and funds to fully re-develop the Merwe-Vierhavens and is quite influenced by local politics.

As the municipality is lacking decisiveness and funds, which are essential for realising an innovation district (Morisson, 2014; Katz & Brandley, 2014), the Stadshavens Rotterdam programme is exploring new collaboration models in which smart use can be made of the landownership at the decisiveness of the Port of Rotterdam Authority in combination with the municipality as representation of the civic society and realise a strong commitment of local politics.

During the process of defining the RID, the director of the Stadshavens Rotterdam programme can be seen as the main initiator of the Innovation District concept. In 2013, an economic scan followed on behalf of the development strategy of the Merwe-Vierhavens to identify the economic profile and opportunities for this specific area to better match between supply and demand now and in the future and allocate potential locational advantages to fortify clusters in CleanTech, Medtech and Food. Transforming the Merwe-Vierhavens and RDM into the Rotterdam Innovation District aims to position these specific areas internationally to attract...
innovative companies. Several challenges were appointed resulting from interviews with key stakeholders:

- Create places to meet within the RID
- Improve accessibility and public transport
- Make active and smart use of cultural heritage
- Develop housing

Several other challenges in line with these observations to realise the RID occurred. Namely, speeding up urban regeneration through a decisiveness organization and enhancing private sector commitment in which market parties are willing to share their ideas – support open innovation – and bring in knowledge and venture capital.

1.2 PROBLEM DEFINITION

The concept of innovation districts is popularized because of successful examples like in Barcelona and Boston. In essence successful innovation districts are built on several sophisticated layer of innovation and form a synergy between economic, spatial, and network assets. Leadership, bottom-up or top-down, is essential to translate this, mostly ‘copy-paste’ urban strategy, into an area responsive to market-forces, open for organic growth and able to spur innovation so that these districts become more than just a label for international attention.

When we compare the case of Rotterdam with the cases of South Boston and 22@ Barcelona (table 5) and through literature review and observations from practice, we can state that within the Rotterdam Innovation District the integration and development of the layers of innovation and the synergy between economic, spatial and network assets creates a big challenge. Mainly because a lack of coordination of and know-how about the innovative processes; uncertainties and inefficiencies within the collaboration model of the Stadshavens Programme; missing private sector commitment and institutions physically present in the area and access to independent funding. The RID is, at the moment, only an innovation district in name and addresses maybe 10% of all aspects needed for an actual successful innovation district.

Of course, translating an urban strategy into a successful implementation, especially as complex as an innovation district, takes time. But to monitor and evaluate the success of innovation districts and to steer upon its desired outcome clear key performance indicators are necessary (Morisson, 2015; Katz and Wagner, 2014).
This research is therefore exploring how Rotterdam can become a successful innovation district over time to meet up the essential requirements concerning a successful innovation district.

1.3 QUESTION STATEMENTS

To translate this topic, *successful innovation districts in relation to the case of Rotterdam*, into an area suited for academic research the problem field and definition is translated into a main research question. To answer this question supportive sub-questions and more practical in-depth questions regarding the case of Rotterdam are formulated.

**MAIN RESEARCH QUESTION**

*How can innovation districts – as urban strategy – be translated into successful innovation districts – as self-sustaining innovation eco-systems?*

The objective of this research is twofold. First, it is providing insights into how innovation districts can be translated into successful innovation districts. The second objective is to translate findings on the main question into recommendations on how Rotterdam can apply these lessons in the realisation of the RID – Rotterdam Innovation District. The main question can therefore be split up in the following questions:

---

<table>
<thead>
<tr>
<th>DRIVER</th>
<th>22@BARCELONA</th>
<th>SOUTH BOSTON</th>
<th>ROTTERDAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIATED</td>
<td>CITY (Mayor)</td>
<td>CITY (Mayor)</td>
<td>CITY (Director Stadshavens)</td>
</tr>
<tr>
<td>MAIN OBJECTIVES</td>
<td>URBAN REGENERATION CLUSTER-BASED BECOME A KNOWLEDGE HUB</td>
<td>URBAN DEVELOPMENT DIVERSTY-BASED REMAIN A KNOWLEDGE HUB</td>
<td>URBAN REGENERATION CLUSTER-BASED BECOME A KNOWLEDGE HUB</td>
</tr>
<tr>
<td>LEADERSHIP</td>
<td>TOP-DOWN INCENTIVES</td>
<td>TOP-DOWN NEGOTIATION</td>
<td>BOTH</td>
</tr>
<tr>
<td>BRANDING</td>
<td>MARKETING TEAM</td>
<td>PUBLIC RELATIONS</td>
<td>BOTH</td>
</tr>
<tr>
<td>URBAN PLANNING</td>
<td>PUBLIC INSTITUTIONS LED</td>
<td>REAL ESTATE COMPANIES LED</td>
<td>PUBLIC-PRIVATE LED</td>
</tr>
<tr>
<td>COLLABORATION TO SPUR INNOVATION</td>
<td>GOVERNMENT UNIVERSITIES COMPANIES</td>
<td>GOVERNMENT UNIVERSITIES COMPANIES SOCIETY</td>
<td>GOVERNMENT UNIVERSITIES COMPANIES SOCIETY</td>
</tr>
<tr>
<td>UNIVERSITIES</td>
<td>IESI</td>
<td>ESADE</td>
<td>EADA UB</td>
</tr>
<tr>
<td>LAY-OUT</td>
<td>former old industrial areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AREA (ha)</td>
<td>200</td>
<td>405</td>
<td>140</td>
</tr>
<tr>
<td>POPULATION CITY</td>
<td>1.621.537</td>
<td>667.137</td>
<td>619.879</td>
</tr>
<tr>
<td>GMP ($BN)</td>
<td>171</td>
<td>360.1</td>
<td>320.6</td>
</tr>
</tbody>
</table>

*Table 5. Case comparison. Based on: Morisson (2015). Own table*
A. How can innovation districts be translated into successful innovation districts?
B. How can the Rotterdam Innovation District be translated into a successful innovation district?

SUB-QUESTIONS

To answer this main question the following sub-questions are essential:

• What is a successful innovation district?
• What are the prerequisites of successful innovation district?
• How can we measure a successful innovation district?

Levels of innovation:

• What defines the levels of innovation?
• How can the levels of innovation within the concept of innovation districts become more sophisticated?

Innovation district assets:

• What are essential economic, spatial and network assets?
• How can the economic, spatial, network assets find synergy?

PRACTICAL-IN DEPTH-QUESTIONS IN CASE OF ROTTERDAM

- How can strong leadership and commitment of key stakeholders be realized?
- What are the prerequisites for a successful RID?
- How can these prerequisites be prioritized?
- How can knowledge and venture capital be brought in?

1.4 RELEVANCE AND UTILISATION POTENTIAL

Because innovation districts have proven to be effective economic solutions a wave of academic research has emerged to analyse innovation districts’ positive effects on job creation and economic development (Glaeser, 2009) but also on popularizing the concept in position papers to rebrand cities (Morisson, 2015). The topic of innovation districts therefore needs a more in depth and systematic analysis to get hold on the distinctive typologies and several levels of formal planning that have emerged over the years.

Research on key performance indicators for the innovation framework is lacking but needed to monitor and evaluate the success of innovation districts (Morisson, 2015; Katz and Wagner, 2014). Therefore this research explores the prerequisites in relation to successful innovation district and how these indicators of success interact and to what extent they define the success of these areas. For the case of Rotterdam, the Stadshavens Rotterdam programme is exploring new collaboration models to realize the RID and is thinking about how to organize and specify the programme of implementation at this very moment. But the RID is only an innovation district in name and addresses maybe 10% of all aspects needed for an actual successful innovation district.
When the Stadshavens Rotterdam programme loses this momentum there is a possibility that the RID remains an innovation district just in its name. This research intents to contribute to prevent that scenario from happening by defining how Rotterdam can realise a successful innovation district.

1.5 LEARNING OBJECTIVES

Within the Graduation Laboratory MBE course book (Department of MBE, 2016) several achievement levels are mentioned. Based on these achievement levels I formulated my top 3 personal learning objectives.

Quality within requirements and preconditions: I would love to gain more knowledge about the relationship between people and the built environment to understand their objectives, needs, standards and wishes and translate their requirements into measurable qualities and manageable factors.

Markets, actors, processes and procedures: Understanding the position and roles of various stakeholders; the decision-making processes and procedures; collaboration models frequently used; risk and ownership allocation; but also the execution and management of urban area development projects can help to get hold on the processes within and the results of urban planning.

Academic contribution: The ability to make an inspiring and innovative contribution at an academic level to the development of the domain of Urban Development Management and to academic research in this area is one of the most important goals in this graduation thesis. With a research on the physical impact of innovation districts I hope to achieve this goal.
CHAPTER 2
RESEARCH APPROACH

This chapter presents the research approach used to undertake the research explained before. It proposes the research strategy, its design, methods, and the case selection. Followed by the research planning and organization.

2.1 RESEARCH STRATEGY & DESIGN

An answer on the main research question will be given through qualitative and empirical research, by adopting both a structured and an unstructured approach (Kumar, 2011). Analysing former academic work and literature study will connect existing studies on innovation districts, innovation eco-systems and, for instance, knowledge hubs to provide indicators that help to assess the requirements for a successful innovation district. The aim in the case studies and interviews is to examine to what extent, and in what ways, these indicators determine the success of an innovation district and how they are related to one another.

This results in a mixed-methods strategy in which theory and practice but also qualitative and quantitative methods are used. In this way research findings can be verified and confirmed and it provides a more comprehensive and grounded answer on the research questions. Both methods within the mixed-method strategy can also complement each other, as one method can be used to fill in the gaps of the other one and they can lie relevant links, promoting mutual understanding. (Johnson, Onwuegbuzie, & Turner, 2007).
As this research deals with the debate regarding the concept of innovation districts, its success factors and their replications, especially for the case of Rotterdam. Its goal is to provide an assessment framework to be able to analyse and compare the transformation of neighbourhoods into successful innovation districts. Qualitative research will help to create a theoretical framework as starting point to carry out the case studies within the empirical part of this research. Besides that it will be used within the synthesis to formulate conclusions and recommendations. Quantitative research contains case studies to examine the theoretical framework and the relations between academic research and practice concerning the research topic of successful innovation districts.

Because of the production of a tool – assessment framework - concerned with producing practical outcomes this research can also be classified as an action research. The research emphasizes the production of practical knowledge and new forms of understanding (Reason and Bradbury, 2001).

Research design

To produce these new forms of understanding and practical knowledge on successful innovation districts an exploratory comparative case study design is chosen. In this type of design the success factors of several innovation districts are explored. According Yin (2014) case studies are used out of the desire to understand complex social phenomena as neighbourhood change and economy of regions and to answer research questions of a more explanatory of exploratory nature around “how” and “why”. Besides that case studies, in essence, try to illuminate a decision or a set of decisions: why they were taken, how they were implemented and with what results and they intend primarily to contribute to policy and decision-making rather than to science (Schramm, 1971). As this research is focussed on advising cities in developing a successful innovation district a multiple case study design seems a suitable approach in order to perform a cross-case syntheses and identify success factors.

2.2 RESEARCH METHODS

In this research data will be collected through literature review, semi- and unstructured interviews and observations from practice. The first part of this research is focused on literature review and practice consultation to define an accurate problem statement and set the theoretical framework for the exploration of the cases that have to be examined. Part two will consist of mainly the empirical research in which data and knowledge from literature studies are connected through semi- and unstructured interviews. Together they form the base for a tool or decision guide and formulates recommendations on how an innovation district can become successful (figure 10).
Desk analysis

The literature study is defined in three parts, namely the exploration of the problem field and research field in order to explore the concept of innovation districts in relation to the case of Rotterdam; the construction of a theoretical framework in order to define success factors and selection criteria for the case selection and a final literature study to combine qualitative and field research and create an assessment method.

Literature study used through desk research for:

- exploration of the problem field & former case studies
- constructing a theoretical framework
- translating empirical findings into a strategic assessment instrument

Interviews

As part of this research, as mentioned before, case studies will be done during field research within the empirical part. These case studies will focus on the success factors of innovation districts and their relationship with respect to each other in order to establish a tool that provides insight in developing successful innovation districts. To gain this information interviews will be used to see how key stakeholders think about the concept of innovation districts, their ambitions within the innovation district and their ideas on the success factors of these districts.

Bias

In literature, research on a topic can be biased due to the fact that the writer has a certain purpose with it, which must be taken into account. One reference may show one perspective on a topic. Therefore two strong visions on innovation districts are used – Morisson and Katz – to set the problem definition and theoretical framework complemented by additional literature to explore the topic of innovation districts, its context, and its success factors more in dept. But there is another possibility in which a bias can emerge. Namely when analysing literature studies and former case studies, I as a reader, can also interpret these documents in a certain way which is in contrast with the perspective of the writer (Bryman, 2012). Or during an interview, me as an interviewer, may steer the interviewee in their answers.
Figure 10. Research approach, own illustration.

How can innovation districts – as urban strategy – be translated into successful innovation districts – as self-sustaining innovation eco-systems?

- Observations
- Relevance
- Motivation

Research Topic

Problem Definition
- Exploratory literature review
- Practice consultation

Research Question

Theoretical Framework
- Process: How?
- Product: What?

Successful Innovation Districts

Methodology
- Assessment criteria
- Case selection

Comparative Case Study Analysis

Field Research
- Case 1
- Case 2
- Case of Rotterdam

Lessons on Successful Innovation Districts

Reflection

Assessment Framework

Conclusion & Recommendations
- Recommendations
- Conclusion
2.3 RESEARCH AND DESIGN OBJECTIVES

*Research objectives*

- Providing insight into the concept of innovation districts
- Acquiring knowledge about the success factors of innovation districts
- Providing insight into the characteristics required for the implementation of innovation districts
- Acquiring knowledge about the characteristics required for the realisation of a successful innovation district
- Gaining knowledge for initiators, landowners, developers and investors – key stakeholders - about successful innovation districts

*Design objectives*

- Creating guidelines for the realisation of successful innovation districts
- Creating a decision guide for a suitable strategy to realise a successful innovation district

2.4 CASE STUDIES

For now, the two cases that complement the case of Rotterdam within this research are not yet selected but an inventory on possible cases will be given (table 6). Important selection criteria that can help to demarcate this research by selecting cases most similar to the case of Rotterdam are *urban form, initiator and drivers*.

The 22@ district in Barcelona was the first innovation district to have been modelled in a top-down approach as urban strategy to re-imagine a former industrial area. Cities strongly influenced by this model and similar in typology are South Boston Innovation District (Massachusetts), Mission Bay (San Francisco, California) and South Lake Union (Seattle, Washington).

Other important aspects to take into account are:

- *governance structure* to being able to reflect it on the case of Rotterdam
- *time frame of development* to being able to define elements of success
<table>
<thead>
<tr>
<th>CASE</th>
<th>URBAN FORM</th>
<th>INITIATOR</th>
<th>DRIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>*High Tech Campus, Eindhoven</td>
<td>*</td>
<td>**</td>
<td>Philips</td>
</tr>
<tr>
<td>*Kista Science City</td>
<td>*</td>
<td>**</td>
<td>industries</td>
</tr>
<tr>
<td>*Stockholm, Sweden</td>
<td>*</td>
<td>**</td>
<td>public sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Electrum Foundation</td>
</tr>
<tr>
<td>*Kings Cross</td>
<td>*</td>
<td>**</td>
<td>66 knowledge-based institutions</td>
</tr>
<tr>
<td>*South Boston Innovation District, Massachusetts</td>
<td>**</td>
<td>*</td>
<td>public</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mayor</td>
</tr>
<tr>
<td>*Mission Bay, San Francisco, California</td>
<td>**</td>
<td>*</td>
<td>Industries</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>public sector</td>
</tr>
<tr>
<td>*22@ Barcelona, Spain</td>
<td>**</td>
<td>*</td>
<td>public sector</td>
</tr>
<tr>
<td>*South Lake Union, Seattle, Washington</td>
<td>**</td>
<td>*</td>
<td>Vulcan, Inc.</td>
</tr>
<tr>
<td>*Detroit Innovation District</td>
<td>*</td>
<td>**</td>
<td>Quicken Loans</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Henry Ford Health</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wayne State University</td>
</tr>
<tr>
<td>*Greater Oakland, Pittsburgh, Pennsylvania</td>
<td>*</td>
<td>***</td>
<td>Carnegie Mellon University and the University of Pittsburgh Medical Center</td>
</tr>
<tr>
<td>*SOMA, San Francisco, California</td>
<td>**</td>
<td>***</td>
<td>tech companies</td>
</tr>
<tr>
<td>*Brooklyn Navy Yard, New York</td>
<td>**</td>
<td>*</td>
<td>Brooklyn Navy Yard Development Corporation</td>
</tr>
</tbody>
</table>

*Urban form:
* anchor-plus model
** re-imaged urban areas

**Initiator:
* top-down urban strategy | government planning
** private sector-led | (corporate) bottom-up leadership
*** organic growth | market forces-responsive
2.5 RESEARCH ORGANISATION

**First domain:** Urban Development Management

**Possible second domain:** Real Estate Management

**Possible third domain:** Housing Management

**Area of Science:** Social and applied science

**Mentors:**

First mentor: Dr. ir. T. Daamen

Second mentor: Dr. ir. A.C. den Heijer

Delegate examiner: M. Pimlott

2.6 | RESEARCH PLANNING

The graduation process takes a year and is divided in five key moments. First an orientation on the subject (P-1), followed by a definite research proposal (P-2). After that the focus lies on executing the research, testing its progress (P-3) and translating it into a report (P-4) to be concluded with a presentation (P-5) in order to graduate. From P-1 until P-3 this research will be parallel to the internship at the Port Authority of Rotterdam. Therefore the summer period will be used to develop the theoretical framework further on and select the cases. August/September will be the starting point for case analysis through interviews.

Table 7. Research planning. own table
CHAPTER 3

LITERATURE

3.1 LITERATURE TO BE USED

Context, urban theories & planning strategies

Jane Jacobs: urban theories on mixed use and lively neighbourhoods; Leon Krier: the size of the city; Alfred Marshall: industrial district theories; Michael Porter: cluster theory

Knowledge, Innovation & Creativity

van Winden: knowledge economy; Yigitcanlar: knowledge-based urban development framework; Saxenian: Tacit knowledge; Storper: Communication; Loet Leydesdorff and Henry Etzkowitz: Triple Helix model on innovation; Carayannis and Campbell: Quadruple Helix model on innovation; Richard Florida: the creative class; Landry: the creative city; Schumpeter: entrepreneurship

Innovation Districts

Morisson: layers of innovation; Katz & Wagner: assets; GREMI: The Innovative Milieu; Fromhold-Eisebith: innovative capacity; Maillat: organisation & desicionmaking in innovation districts
3.2 REFERENCES


CIC (2014), CIC Innovation Ecosystem Analysis: Rotterdam + The Netherlands. Cambridge: Cambridge Innovation Center


Pressure cooker (2016). Het Rotterdam Innovation District en de betekenis voor de ontwikkeling van M4H en RDM. Intern document, 9 maart


