From Ambition to Innovation

A closer look at the physical characteristics of innovation districts

Tuur Pluijmen

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Research Institution
Faculty of Architecture and the Built Environment, Delft University of Technology
Master Management in the Built Environment
Chair of Urban Development Management

Mentors
1st mentor Dr. W.J. Verheul – Research fellow and lecturer at Delft University of Technology
2nd mentor Dr. F.T.J. Curvelo Magdaniel – Postdoctoral researcher at Delft University of Technology
External examiner Dr. Ir. W.J. Quist – Lecturer at Delft University of Technology

Internship
Municipality of The Hague
Mentor: Dr. P. Pol

Contact information
A. Pluijmen
tuurpluijmen@gmail.com

Preface

The research in front of you is the result of a strong interest in the development of cities, especially in the context of the contemporary dynamics of global economics. Early on in my time as a student, I felt the need to put things in the perspective of a comprehensible context. Therefore, after completing my bachelor's degree in urbanism at the Amsterdam University of Applied Sciences, I decided to explore this context more thoroughly by pursuing a master's degree in Management in the Built Environment at the Delft University of Technology. The knowledge gained during this period has given me a significantly deeper understanding of the actors and resources in play in the dynamic world that is the built environment. What is more, it has confirmed my suspicion that urban planning is a complex process with a large variety of actor types and policy strategies.

Conducting research for this master thesis turned out to be, as expected, challenging. Particularly the quest of finding a focal point proved troublesome in the early stages of the research. I would like to express my gratitude to my mentors, Wouter Jan Verheul and Flavia Curvelo Magdaniel, who have been there to guide me along the way. Even though my research process had its ups and downs and both had their own busy schedules, they would always find the time and words to get me back on track and uncover the right way to move forward.

My time at the municipality of The Hague has been a valuable experience and has greatly improved my knowledge of the practice of innovation districts. I would like to thank my co-workers and in particular Peter Pol, who involved me in the entire process of the development of the district.

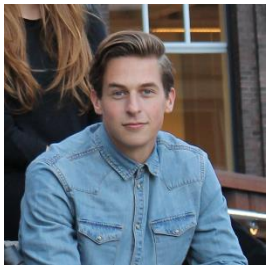
I would also like to thank all the interviewees that have participated in this research. The knowledge gained from these interviews have helped me construct a perception of the situation at hand that I would otherwise have not been able to attain.

Another word of gratitude goes out to the respondents of the questionnaire. In this day and age, where online surveys are widely apparent, it is simple to discard them. Therefore, I would like to thank the respondents for not ignoring my contact attempts and taking the time to contribute to this research.

Finally, a special thanks goes out to my friends and family. Without their unconditional support and advice I would not have been able to complete this thesis.

I hope you will enjoy reading my thesis as much as I have enjoyed my time developing it. The complex world of the development of cities is a realm that has yet to seize to intrigue me and I hope this report will pass some of this curiosity onto its reader.

Tuur Pluijmen



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Management Summary

Abstract

Context: The city of The Hague is located in The Netherlands, in the province of Zuid-Holland and with nearly 500,000 inhabitants it is the third largest city of the country. The increasing dynamics of globalization have also made its way to The Hague, where urban competitiveness is increasingly considered to be an important aspect for the city's future. In an attempt to reach high levels of urban competitiveness, the municipality of The Hague has recently announced its plans for the development of an innovation district.

Objective: The objective of this research is to intensively analyse a specific case (the innovation district in The Hague) and, in doing so, add to the scientific literature concerning innovation districts. By performing an empirical analysis about the demands of different groups in an innovation district and the ambitions and policies on the steering side, this research attempts to clarify what the physical needs are of specific groups of actors within the context of the innovation district in The Hague. What is more, it attempts to draw conclusions regarding the relationship between physical interventions and the development of innovation districts.

Methods: This thesis is divided into five main components: an introduction, a theoretical framework, a case analysis, the conclusions and recommendations and a reflection. The methods that have been used in this research are a literature review, interviews and a questionnaire. The quantitative data of the questionnaire has been statistically analysed by calculating the median and the inter-quartile range of each variable. What is more, frequency tables have been developed to create a more detailed image of the results of each variable. Pearson's r and Pearson's chi-square method have finally been used to discover significant differences and correlations.

Results: The results of the case study indicate several aspects that have high levels of importance to specific groups within the district, while others show lower levels of importance. The results of the levels of satisfaction of the different aspects within the district also show varying results for different sub-areas. The analysis of the 22@ district in Barcelona has also revealed a number of physical interventions related to the development of the district.

Conclusion: This research has resulted in a number of conclusions relating to the development of innovation districts. First, municipal leadership appears to be key in the early stages of a top-down initiated innovation district. Then, it has become apparent that the needs of the users of innovation districts go beyond sheer accessibility. Walkability, bike-ability and the presence of hospitality services are nearly equally important. However, user groups also have specific needs that other groups do not have. Therefore, when the vision is to create a mixed environment, it is important to consider these needs, otherwise innovation districts run the risk of having dispersed user groups. Another conclusion is that physical proximity does not guarantee learning (there is a need for common ground) and that physical conditions alone are not sufficient for innovation to take place. Finally, the cases studied in this research have shown that the brand 'innovation district' is being used by cities as a model to strive for, rather than a label that corresponds with the physical and economic situation at hand.

Keywords: Innovation, Innovation Districts, Urban Planning, Case Study, The Hague

Introduction

The increasing dynamics of globalization have caused for a growing importance of urban competitiveness. In an attempt to reach high levels of competitive advantage, cities are increasingly focusing on innovation as a means of achieving distinctiveness. In doing so, municipalities set up 'innovation districts' where innovation is claimed to be highly stimulated by different factors. One of these factors is the built environment. This research specifically focuses on the role of the built environment in these districts and therefore analyses the physical interventions by municipalities that are made in order to stimulate the process of innovation by firms, universities and institutions.

Problem Statement

A recent trend among Dutch municipalities (along with other parts of the world) has been to create districts where innovation is stimulated and knowledge is being shared in an urban context (Financieel Dagblad, 2016b). These so-called 'Innovation Districts' attempt to mimic the success of Silicon Valley, California, which is home to many highly innovative high-tech firms. However, although these new districts look at Silicon Valley as an example, they differ in setting. Katz and Wagner (2014) have described this 'rise of innovation districts' as the process of moving innovation from the secluded science park outside of the city to highly urban settings where innovation is openly shared. The idea is that people are no longer secretly working on new solutions, but instead are discussing their newest ideas in trendy coffee bars that are located in a buzzing urban context. Large firms, universities and start-ups come together in such a district to share knowledge and work on solutions for the future. At least, that seems to be the idea. It appears that not everyone agrees with the benefits of creating an innovation district. Recently, Boschma expressed his discontent with the growing number of such 'clubs' of innovation. Innovation districts, as Boschma argues, are good for creating a positive image, but the actual results are minimal (Financieel Dagblad, 2016a). Furthermore, Boschma (2005) has argued that 'simple' co-location is neither a prerequisite nor a sufficient condition for collaboration. Van Oort and Bosma (2013) further acknowledge the role of entrepreneurship as an important source of innovation. However, it seems that providing (affordable) space for entrepreneurship (e.g. start-ups or spin-offs) in an area with soaring rental prices requires a challenging balancing process.

These issues raise questions as to what creating an innovation district actually means. Are districts just given a new name to increase the image of the area? Or are there physical interventions being done that stimulate the process of innovation? And moreover, what is it that companies need from their built environment in order to be able to innovate? This research attempts to address this issue by looking deeper into the physical interventions in innovation districts as well as the needs of the actors responsible for innovation in relation to their built environment.

Research questions

The main research question of this research is:

"What kind of physical interventions are needed in innovation districts to stimulate the process of innovation of its users?"

In order to be able to answer this question, the following sub-questions have been formulated:

1. Why is urban competitiveness increasingly important for cities?
2. How does innovation take place in firms and institutions and why is this important for cities?
3. What is the concept of an innovation district?
4. How can innovation be stimulated through municipal policy?
5. What is already known about the general physical characteristics of innovation districts?
- **Literature review**

6. To what extent are the concepts in sub-questions 1, 2, 3, 4 and 5 aligned with the ambitions of the municipality where the case is located in?
– **Review of policy documents, semi-structured interviews**
7. What types of innovative entities is the innovation district targeted at?
– **Review of policy documents, semi-structured interviews**
8. What are the goals and policies of actors operating on the steering side regarding the district?
– **Review of policy documents, semi-structured interviews**
9. How do innovative entities, located in the innovation district, rate their current built environment and the current image in relation to their goals and needs?
– **Structured interviews**
10. To what extent are the goals and policies of the actors operating on the steering side in line with the demand of innovative entities operating in the innovation district?
– **Comparison of empirical results**

The different sub-questions have been answered in different chapters. A literature review has been performed to answer questions 1 to 5, while questions 6 to 10 have been answered by performing an empirical analysis. The empirical analysis includes interviews with different actors, a survey amongst users of the district and a review of policy documents.

Theoretical Framework

Research Design and Methodology

Figure I displays the research design of this thesis, which is divided into five parts. The first part serves as an introduction. Here, the research will be introduced by discussing the motivation, the relevance and the problem statement of this research. The introduction part concludes with an overview of the main research question and its accompanying sub-questions. In the second part, the theoretical framework will be defined which serves as the main structure of this research. Here, the results of the literature review are discussed and the research design and methodology are elaborated on. The third part comprises the empirical analysis of the research. Here, the 22@ case in Barcelona and the Central Innovation District in The Hague are analysed. In part four, the conclusions of this research will be presented as well as implications for policy and practice. Finally, in part five, the reflection and discussion of this research are disclosed.

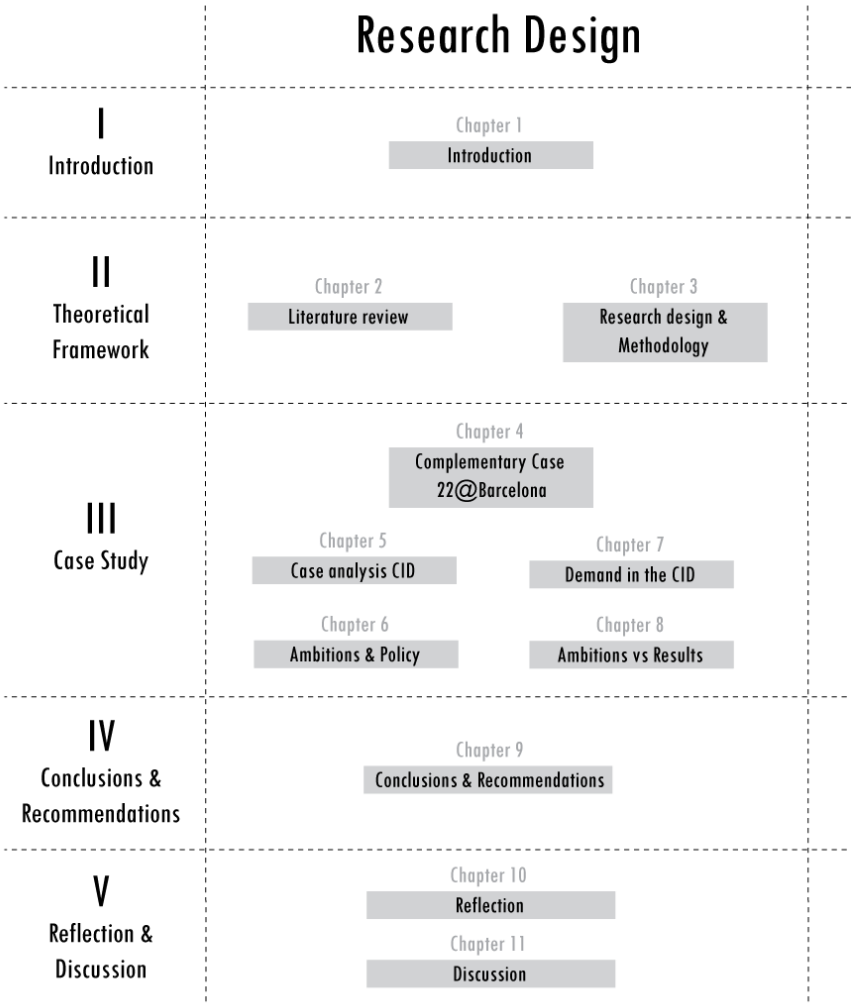

Figure I. Research design

Figure II provides the conceptual model for this research. This research specifically focuses on the built environment as a means to stimulate innovation in innovation districts. By stimulating innovation, this could ultimately lead to a competitive advantage for municipalities. On the 'steer' side, steering actors have their own policies that have an effect on the built environment. Such actors include municipalities, but could also include developers or universities. These actors are the ones that have the power to steer and change the built environment. On the 'demand' side, innovative entities are the ones that use the built environment. Such entities include large firms or research institutions, but could also include start-ups or spin-offs. Depending on the case, the types of entities that are involved in creating innovation can vary. The 'demand' side makes use of the 'supply' (the built environment) as the location where they operate their business. This research will specifically focus on how the 'demand' side rates the built environment in relation to their needs and goals, and how the 'steer side' is shaping the built environment in a way that they feel will stimulate innovation. Ultimately this will lead to a comparison as to whether the goals and corresponding actions of the steering actors are in line with the needs and goals of the 'demand' side.

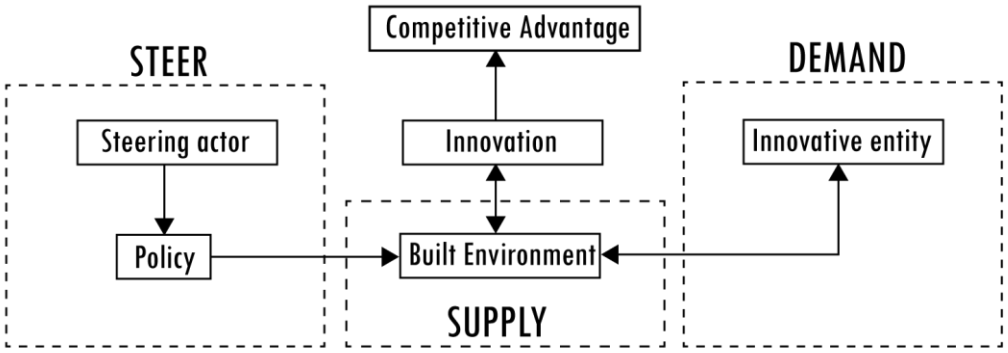

Figure II. Conceptual Model

For this research, a single case study has been chosen, as described by Bryman (2012). The case has been analysed by performing interviews with the steering side of the built environment and simultaneously spreading a questionnaire amongst the demand side in the district. Moreover, a complementary case has been chosen (22@ Barcelona) to be able to draw lessons from which can potentially be used for the development of the innovation district in The Hague.

Literature review

Globalizing context
"Why is urban competitiveness increasingly important for cities?"

It appears that increasing dynamics of globalization are putting more pressure on cities to market themselves and distinguish themselves from their peers. Segbers (2007) formulates two reasons for this. Firstly, he argues that many central state governments are overburdened with a growing task load and rising expectations and as a response are opting to devolve political authority and responsibilities to sub-state levels. Secondly, cities and regions are increasingly becoming sites of self-induced and self-centred economic activities, innovation, and growth independent from the national economic government. Recently, there has been a growing focus on innovation as a means to achieve high levels of distinctiveness and increase the global competitiveness of these cities. Innovation districts are being put forward as important sources for such high levels of innovation. However, some authors address the issue that such brands should show a relation with the built environment (e.g. Goess et al., 2016; Hospers, 2011). Municipalities have an important task at hand, as they usually have a significant role in steering the built environment.

Innovation
"How does innovation take place in firms and institutions and why is this important for cities?"

An important conclusion to be drawn from this chapter is that innovation is an ambiguous concept. Different authors use different definitions of innovation, as well as different indicators of measuring it. Some authors are also considering entrepreneurship to be a driving force of prosperity and link this to the innovative power they have. The level of innovation in cities seems to play an increasingly important role in a globalizing world and this can be seen in the way contemporary urban strategies are increasingly considering innovation as a means of achieving a competitive advantage. However, because of the varying indicators that are used to measure innovation, it is important to bear in mind how each actor defines innovation when analysing the strategies they use to achieve higher levels of innovation. What is more, each firm type and economic sector has its own pathways and channels for innovation (Andes, 2016, Arora et al., 2016), which makes it important to discover these for each individual innovation district.

Innovation Clusters
"What is the concept of an innovation district?"

Globally, a shift can be recognized from closed-off science parks outside the city towards more urban contexts as a source for innovation (as described by e.g. Katz & Wagner, 2016). Where in the past innovation was considered to be created in secretive environments, it now increasingly seems to be considered as having an open character. Such 'innovation districts' are characterized by urban settings and a high level of walkability. However, several authors have expressed their criticism and it is important to bear in mind these points of attention when conducting the research. As Boschma (2005) argues, simple co-location does not automatically stimulate the collaboration between firms. When analysing the cases, it will be essential to see whether municipalities are recognizing this and are doing more than just co-locating innovative entities.

Innovation & Policy
"How can innovation be stimulated through municipal policy?"

Municipalities have an important role to play in the development of innovation districts, as they often are able to facilitate development in the area and are responsible for the public space. However,

because of the significant role of the market in innovation districts, it will be necessary for municipalities to find a balance between facilitating as well as steering the market. Particularly in the start-up phase of the district, the municipality has a leading role where a vision needs to be put forward to create commitment amongst the variety of actors in the district (Clark et al., 2016; Adams & Tiesdell, 2010). After this has been achieved, the physical assets (as described by Katz and Wagner, 2014) can be leveraged to stimulate innovation and facilitate firms, while at the same time zoning plans can be used to steer development in the area.

Innovation & the built environment

"What is already known about the general physical characteristics of innovation districts?"

This chapter has revealed several actors that are generally involved in innovation districts. Furthermore, it has mentioned several physical aspects of knowledge locations that are appreciated by innovative entities. These actors and aspects will act as a base from which data can be gathered by performing an empirical analysis on the different actors involved in the cases. Chapter 4 will further elaborate on this and will explain how the different aspects of the built environment will be used as topics that guide the empirical analysis. The physical aspects that have been used throughout this research can be seen in the following table:

Infrastructure	Functions & Amenities	Design	Image
Diversity of infrastructure Pedestrian oriented infrastructure Public transportation Physical connectors Linking anchor institutions to district Connection district with broader metro	Flexible facilities Access to diverse amenities/functions Public and semi-public meeting and working places Mixed-use buildings Exhibition and piloting space, showrooms Shared facilities Venues for training & education, cultural events & entertainment Small scale parks & plazas Mixed-income housing Neighbourhood-serving retail Affordable space for start-ups Digital-accessibility	Design of built environment in terms of being inviting and welcoming (e.g. transparent and light materials) Modularity, standardization and openness of buildings	Uniqueness of identity Quality of place (attractiveness) International reputation (media coverage) Geographic features

Table I. Categories and aspects of the built environment used in this research

(based on Curvelo Magdaniel, 2016; Katz & Wagner, 2014; Winden & Carvalho, 2015, 2016)

Case study

Complementary case: 22@ Barcelona

By performing an analysis of the 22@ district in Barcelona, several physical and economic/institutional interventions have been identified which have significantly assisted in the development of the district. Table II provides an overview of these aspects.

22@Barcelona	
Physical interventions	Economic/Institutional interventions
• Construction incentives (MPGM 22@) • Special Infrastructures Plan (PEI) • 7@ Amenities • Heritage preservation • Urban Lab	• Clusters • 22@Network • 22 Arroba BCN • Definition Innovation • Triple Helix • Proactive approach

Table II. Overview of physical and economic/institutional interventions in the 22@ district in Barcelona, Spain.

It can be concluded that the municipality of Barcelona had a significant role to play in the development of the district (particularly in the early stages) and has adopted a proactive approach in steering the district to the municipality's preferred direction. Decisive interventions on the physical side have been the plan for construction incentives, the Special Infrastructures Plan, the 7@ amenities, the heritage preservation plan and the use of the district's public space as an urban lab. On the economic/institutional side, important interventions have been the district's focus on specific economic clusters, the creation of the 22@Network and the construction of the municipal company 22 Arroba BCN. Moreover, the municipality's definition of innovation, its adoption of the triple helix model and its proactive approach have been important in creating a clear direction for the district.

Central Innovation District The Hague

"What are the goals and policies of actors operating on the steering side regarding the district?"

Category	Ambition
Infrastructure	• Decrease use of cars • Better division of use of modes of transport (modal split) • Optimal accessibility • Less space taken up by infrastructure • Increase walkability • Increase bike-ability • Sustainability
Functions & Amenities	• Mix of functions • Day & night activity • More housing • Start-up climate • Event-city • Student-city • Live- and work environment for young (entrepreneurial) people • City centre environment
Design	• Increase open appearance of buildings • Flexibility of space (suitable for multiple uses) • Inviting public space • Connect buildings with environment (main routes)
Image	• Create a strong brand • Commitment • Strong international reputation • Cluster for Peace, Justice, Security and governance
Other	• Start-up climate • Generate jobs for the metropolitan region • Sustainability • Inclusiveness

Table III. Overview of the municipality's ambitions for the innovation district

Table III displays the ambitions of the municipality. Since the district is still in an early stage, policies mostly revolve around creating a clear vision for the area and connecting with important actors in the district. Physical interventions to further develop the district are the addition of housing, investing in infrastructure and public space and allowing for more types of uses in specific areas within the district.

"To what extent are the concepts in sub-questions 1, 2, 3, 4 and 5 aligned with the ambitions of the municipality where the case is located in?"

The main concepts of the theory about innovation districts appear to be aligned with the municipality's ambitions. In terms of the physical interventions needed to develop the district into an innovation district, the municipality of The Hague, similar to literature, aims at increasing both the walkability and the bike-ability of the district and has the ambition of creating a diverse environment with a mixture of functions. What appears to be less clear, however, is the main economic focus of the district. Since the district is in an early phase, a thorough economic analysis of the district will give a clearer insight into its assets and potential growth sectors.

"What types of innovative entities is the innovation district targeted at?"

Due to the early stages of development the district is currently in, the municipality of The Hague is still evaluating the types of actors they wish to target with the district. However, what has become clear from this research is that the municipality appears to be focusing on actors that are typically linked to innovation districts for the spurring of innovation: universities, start-ups and firms. What is more, the municipality of The Hague is contacting a variety of institutions (e.g. housing associations, public transportation) to discover their perspective on the district and see where potential roles and partnerships can be formed.

"How do innovative entities, located in the innovation district, rate their current built environment and the current image in relation to their goals and needs?"

From the results of the questionnaire that has been spread out among firms and universities in the district, it can be concluded that there exist both similarities and differences between the demand and level of satisfaction of the different user groups. Important aspects to all sub-groups can mostly be found in the category of infrastructure. An optimal accessibility by public transport, walkable and bike-able environments appear to be important to all user groups. What is more, all user groups consider the presence of hospitality services to be particularly important. For start-ups, the brand, the uniqueness of the identity of the area and the affordability of office space are especially important.

In terms of satisfaction, the most important finding is that the physical context of the Central Innovation District does not resemble that of an innovation district in all its facets. Figure III displays the results per sub-area. The numbers relate to the response of the questionnaire, where 1 and 2 are negative, 3 is neutral and 4 and 5 are positive. Anything below 3, therefore, represents a general dissatisfaction. Accessibility by public transport appears to be one of the area's main strengths. The areas around the Central Station and Laakhaven Hollands Spoor show high levels of satisfaction is

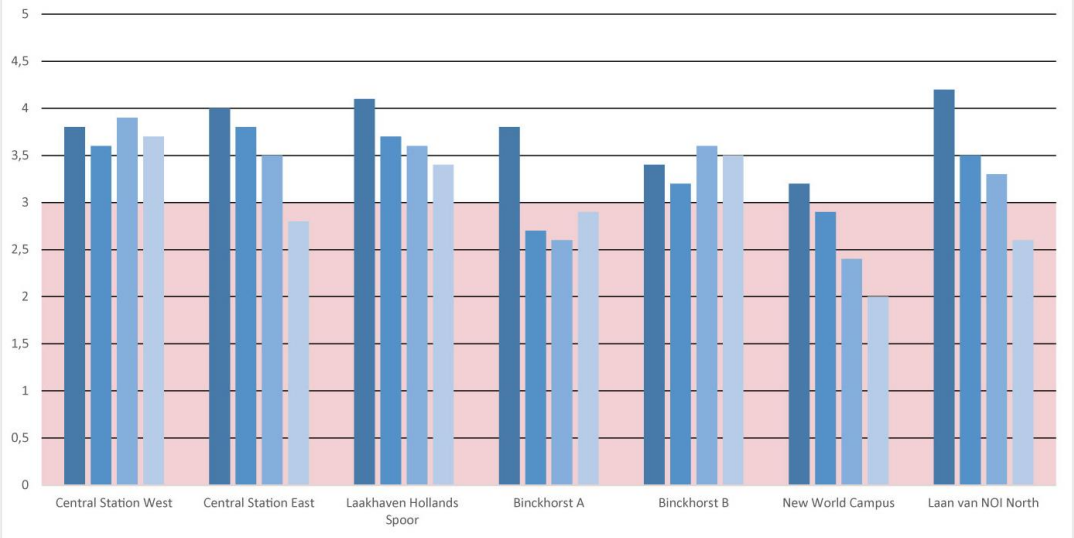

Figure III. Overview of satisfaction per area

nearly all aspects of the questionnaire, while the Binckhorst and the area around the New World Campus show significantly lower results. What is more, the Laan van NOI area shows particularly high results in terms of infrastructure (especially accessibility by public transport), but significantly lower results in the other categories.

"To what extent are the goals and policies of the actors operating on the steering side in line with the demand of innovative entities operating in the innovation district?"
It appears that most of the aspects that are thought to be important by the users of the district are considered in the policies of the municipality. The aim for an optimal accessibility, walkable and bike-able environments with a high mixture of functions and amenities corresponds with what the user groups find to be important. A relative gap can be observed in the amount of flexible workplaces for students and public internet connections. Such aspects can improve the mixture of user groups within the district, although it does require a certain level of cooperation between steering actors.

Conclusions

The following statements have been developed that conclude the most significant findings of this research:

1. "Leadership of the municipality is key in the early stages of a top-down initiated innovation district"

2. "Innovation districts offer more than just high levels of accessibility; they offer walkable, bike-able environments with a variety of amenities and a unique brand"

3. "Physical conditions alone are not sufficient for innovation to take place"

4. "Proximity does not guarantee learning: there is a need for common ground"

5. "If innovation districts do not represent the individual needs of its users, user groups may become dispersed and the benefits of geographical proximity could decrease"

6. "The brand "innovation district" is being used by cities as a (flexible) model to strive for in order to be able to increase cities' levels of urban competitiveness and become more resilient"

With the available information of the research and the answers to the sub-questions, the main research question has been attempted to be answered:

"What kind of physical interventions are needed in innovation districts to stimulate the process of innovation of its users?"
What this thesis has primarily revealed, is that physical interventions alone are not enough to stimulate the process of innovation of firms and institutions located in an innovation district. Hovering above the physical district, a strong network between government, market actors and educational institutions is needed.

What this research has revealed, however, is that there are a number of physical interventions that have been proven to be important in both the case of the 22@ district in Barcelona and the Central Innovation District in The Hague. In both cases, particular importance goes out to aspects related to infrastructure. Especially accessibility by public transport (both within the city and in the greater metropolitan area) appears to be of the utmost importance. Other important aspects in the category of infrastructure appear to be the level of bike-ability and walkability the area possesses. What is more, this research has also indicated that other types of aspects are considered to be important in innovation districts. Where the 22@ district has shown a strong focus on the creation of amenities for

both public and private purposes, the user groups in The Hague show a strong need for hospitality services.

However, not all aspects show such levels of importance for all user groups. While start-ups in the area have indicated a strong importance for the brand and uniqueness of the identity of the area (image), students and university staff do not find these aspects to be particularly important. It indicates a need for caution regarding the generalisation of the importance of specific aspects of innovation districts. Therefore, in order to be able to stimulate the process of innovation within an innovation district, it is important to acknowledge the different needs of the user groups within the district and find a balance in the (physical) supply that will create a mix of different types of users. When focusing on innovation as the main goal for a district, the physical environment should be supporting this. Innovation is a process that differs strongly per economic sector and firm size, which makes it even more important to consider the individual needs of the users of the district. This means that the built environment should reflect the individual needs that its users have which allow them to be able to innovate. The built environment, in that sense, should be a physical representation of the pathways of innovation of its individual users.

Implications & recommendations for policy and practice

Finally, several implications and recommendations for policy and practice have been formulated.

Pathways of innovation: It has become clear from literature (e.g. Arora et al., 2016; Andes, 2016) that pathways of innovation differ significantly per economic sector and firm size. Therefore, it is critical to perform a detailed analysis of the economic sectors and firms within an innovation district in order to discover the pathways that each firm uses to be innovative.

Place-based approach: Since innovation districts are generally large areas with a variety of sub-areas with their own individual characteristics, developing the entire district at once is costly. Therefore, it might be wise to consider a focus on places rather than the entire district and build from there. An analysis of both physical and economic assets of a district can prove helpful to identify sub-areas that show potential for such a place-based approach.

Branding: As has become apparent in this research, it is of critical importance to create commitment amongst users in order to be able to grow the district. According to place-branding theory, successful brands are those that have a connection between the brand and the physical/economic environment (e.g. Vanolo, 2008; Turok, 2009; Hospers, 2011 and Goess et al., 2016). In other words, successful brands have proof that what they claim to be is actually true. In order to create commitment, it is therefore important to design a brand that is credible and will spur commitment amongst the users of the district.

Urban lab: In the 22@ district in Barcelona, the development of an urban lab has contributed to making innovation in the area explicit. In The Hague, or in any other city for that matter, where innovation mostly takes place behind closed doors, developing a framework for an urban lab can help to make innovation more explicit and increase the credibility of the brand.

Clear vision: From the analysis of both the 22@ district and the Central Innovation District it has become clear that a clear vision is important in the early stages of an innovation district. The municipality should express a clear vision about the direction and strengths of the district, in order to be able to create commitment amongst firms and institutions and bring the district to a new level.

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PART I

Introduction

1. Introduction

The goal of this chapter is to give the reader an introduction to the research by giving a personal motivation as well as a personal vision on urban development. Furthermore, it positions the research by describing the context into which the research is placed.

The increasing dynamics of globalization have caused for a growing importance of urban competitiveness. In an attempt to reach high levels of competitive advantage, cities are increasingly focusing on innovation as a means of achieving distinctiveness. In doing so, municipalities set up 'innovation districts' where innovation is claimed to be highly stimulated by different factors. One of these factors is the built environment. This research specifically focuses on the role of the built environment in these districts and therefore analyses the physical interventions by municipalities that are made in order to stimulate the process of innovation by firms, universities and institutions.

This report is divided into five parts. The first part serves as an introduction. Here, the research will be introduced by discussing the motivation, the relevance and the problem statement of this research. The introduction part concludes with an overview of the main research question and its accompanying sub-questions. In the second part, the theoretical framework will be defined which serves as the main structure of this research. Here, the results of the literature review are discussed and the research design and methodology are elaborated on. The third part comprises the empirical analysis of the research. Here, the 22@ case in Barcelona and the Central Innovation District in The Hague are analysed. In part four, the conclusions of this research will be presented as well as implications for policy and practice. Finally, in part five, the reflection and discussion of this research are disclosed.

1.1 Motivation

The increasing globalization and the contemporary branding of cities seem to lead cities into a search for distinctiveness. To me, it is intriguing to see how this goal of being distinctive ironically seems to lead many cities into the same direction. A recent trend has been the goal of becoming a leading city in the field of innovation. The well-known source of innovation of Silicon Valley in California appears to be an example for cities in achieving high levels of innovation. In the quest of setting up their own 'Silicon Valley', cities have announced their own innovation valleys (e.g. Robovalley Delft or Health Valley Nijmegen). Having a background in urbanism myself, I am interested in bottom-up approaches that take into account what is actually needed from the people using the space. This research will hopefully give me an insight into how such innovation strategies are being experienced by the people responsible for creating innovation and what it is that they truly need.

Having finished a bachelors in urbanism, as well as a pre-master that mostly revolved around design, I felt it was important to know what other forces and actors are in play in the creation of the built environment. This led me to choosing the master Management in the Built Environment. Over the course of this master, I have become aware of many important factors that have to be dealt with in the construction industry. This has further strengthened my perception that in order to become a successful urban planner, one has to be aware of the dynamics of the market and different actors involved.

1.2 Positioning the research

In 2013, Forbes released their list of "World's most inventive cities"[1] and announced that Eindhoven was the most inventive city of the world at that point. The High-Tech campus in Eindhoven has significantly contributed to the development of innovation within the city and has become an example of how clustering can contribute to the creation of innovation. In an attempt to reach such levels of

[1] https://www.forbes.com/sites/williampentland/2013/07/09/worlds-15-most-inventive-cities/

innovation, many cities and regions are announcing their own 'Innovation Districts' (Financieel Dagblad, 2016b). Recently, Rotterdam and The Hague have also announced their own innovation districts, respectively the Rotterdam Innovation District (RID) and the Central Innovation District (CID). In comparison with two other main regions in the Netherlands (Eindhoven and Amsterdam), the province of South-Holland and the metropolitan region of Rotterdam and The Hague (MRDH) appear to be falling behind in terms of innovation (Provincie Zuid-Holland, 2012). Although the potential is there, the region has up until now not been able to fully turn this potential into an asset. This research aims to contribute to the stimulation of innovation within the cities of the specific cases.

Problem Statement

A recent trend among Dutch municipalities as well as in other parts of the world has been to create districts where innovation is stimulated and knowledge is being shared in an urban context (Financieel Dagblad, 2016b). These so-called 'Innovation Districts' attempt to mimic the success of Silicon Valley, California, which is home to many highly innovative high-tech firms. However, although these new districts look at Silicon Valley as an example, they differ in setting. Katz and Wagner (2014) have described this 'rise of innovation districts' as the process of moving innovation from the secluded science park outside of the city to highly urban settings where innovation is openly shared. The idea is that people are no longer secretly working on new solutions, but instead are discussing their newest ideas in trendy coffee bars that are located in a buzzing urban context. Large firms, universities and start-ups come together in such a district to share knowledge and work on solutions for the future. At least, that seems to be the idea. It appears that not everyone agrees with the benefits of creating an innovation district. Recently, Boschma expressed his discontent with the growing number of such 'clubs' of innovation. Innovation districts, as Boschma argues, are good for creating a positive image, but the actual results are minimal (Financieel Dagblad, 2016a). Furthermore, Boschma (2005) has argued that 'simple' co-location is neither a prerequisite nor a sufficient condition for collaboration. Van Oort and Bosma (2013) further acknowledge the role of entrepreneurship as an important source of innovation. However, it seems that providing (affordable) space for entrepreneurship (e.g. start-ups or spin-offs) in an area with soaring rental prices requires a challenging balancing process.

These issues raise questions as to what creating an innovation district actually means. Are districts just given a new name to increase the image of the area? Or are there physical interventions being done that stimulate the process of innovation? And moreover, what is it that companies need from their built environment in order to be able to innovate? This research attempts to address this issue by looking deeper into the physical interventions in innovation districts as well as the needs of the actors responsible for innovation in relation to their built environment.

1.3 Research relevance

This chapter discusses the relevance of this research from different perspectives. First, it discusses the relevance of this research from a scientific point of view. Then, it discusses the societal relevance of the research. Finally, it discusses to which actors this research might be useful.

1.3.1 Scientific relevance

This research aims to contribute to research on the link between innovation and the built environment. It specifically focuses on the physical interventions that can be done in innovation districts in order to stimulate the process of innovation by innovative entities. The empirical analysis aims to contribute to research on how steering actors can stimulate innovative entities that are located in innovation districts. The final result of this research could prove useful for researchers that are conducting research on the link between innovation and the built environment, as well as researchers interested in the development of innovation districts.

1.3.2 Societal relevance

This research aims to produce an outcome that will provide a better understanding of how to translate an ambition for creating an innovation district into corresponding physical interventions. This will help create a link between the brand 'Innovation District' and the actual built environment, and aims to contribute to higher levels of innovation within the district. By performing an empirical analysis on the preferences of the end-user, the results of this research will provide municipalities with a better understanding of how to create an environment that matches the preferences of the users of innovation districts. In the long run, this could improve the competitiveness of the city in which the case is located and help stimulate its economy. Considering the high levels of infrastructural as well as institutional connections between cities within the Randstad, this could potentially prove beneficial for the development for the Randstad as a whole.

1.3.3 Research Usefulness

The end results of this research could be useful for municipalities in the Netherlands to better understand how to stimulate innovation in innovation districts through physical interventions. This could specifically help policymakers and urban planners/designers in making decisions regarding the development of innovation districts. Ultimately, the end users of innovation districts (firms, universities and institutions) could profit from these interventions by being able to take advantage of an environment that helps them be more innovative.

1.4 Research Questions

In order to address the issue that has been explained in the problem statement, the following question will be used as a main research question:

"What kind of physical interventions are needed in innovation districts to stimulate the process of innovation of its users?"

This question addresses several issues. Firstly, it is about the physical interventions in the built environment. These interventions could range from providing a high-quality infrastructure network to land-use plans that allow for a mixture of amenities. Secondly, it addresses how the built environment stimulates the process of innovation. This aspect is not only about what is done to stimulate the process of innovation by innovative entities, but also what 'stimulating innovation' means to municipalities. Is it just about attracting and co-locating the companies and institutions that are considered as 'innovative', or is there more to it? Finally, 'innovative entities' are considered as the sources of innovation. These actors can differ per case and will be further explained later on in this report.

In order to be able to answer the main research question, the following sub-questions will be used and linked to particular processes/phases of the research:

1. Why is urban competitiveness increasingly important for cities?
2. How does innovation take place in firms and institutions and why is this important for cities?
3. What is the concept of an innovation district?
4. How can innovation be stimulated through municipal policy?
5. What is already known about the general physical characteristics of innovation districts?
- **Literature review**

6. To what extent are the concepts in sub-questions 1, 2, 3, 4 and 5 aligned with the ambitions of the municipality where the case is located in?
– **Review of policy documents, semi-structured interviews**

7. What types of innovative entities is the innovation district targeted at?
– **Review of policy documents, semi-structured interviews**
8. What are the goals and policies of actors operating on the steering side regarding the district?
– **Review of policy documents, semi-structured interviews**
9. How do innovative entities, located in the innovation district, rate their current built environment and the current image in relation to their goals and needs?
– **Structured interviews**
10. To what extent are the goals and policies of the actors operating on the steering side in line with the demand of innovative entities operating in the innovation district?
– **Comparison of empirical results**

The different sub-questions have been answered in different chapters. A literature review has been performed to answer questions 1 to 5, while questions 6 to 10 have been answered by performing an empirical analysis. The empirical analysis includes interviews with different actors and the review of policy documents. The methods of this research are further explained in chapter 4. The following chapter will go into further detail about the research by providing a conceptual model and explaining the different concepts that are applicable to this research.

1.5 Concepts

1.5.1 Conceptual Model

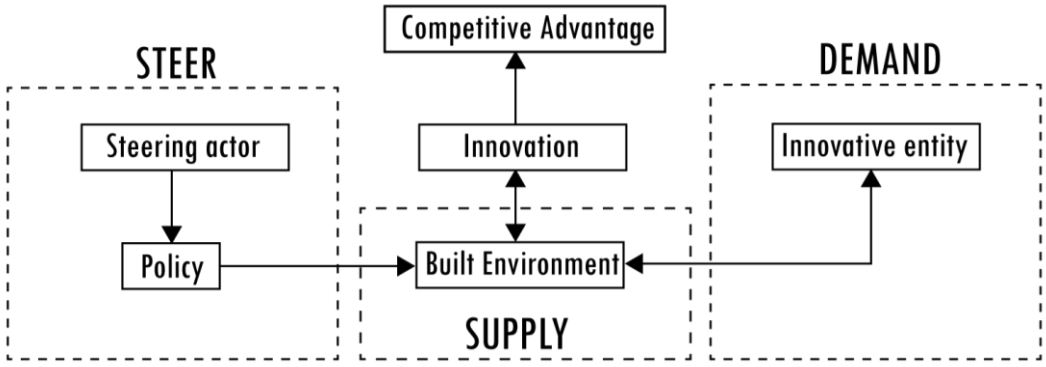


Figure 1. Conceptual Model

Figure 1 provides the conceptual model for this research. This research specifically focuses on the built environment as a means to stimulate innovation in innovation districts. By stimulating innovation, this could ultimately lead to a competitive advantage for municipalities. On the 'steer' side, steering actors have their own policies that have an effect on the built environment. Such actors include municipalities, but could also include developers or universities. These actors are the ones that have the power to steer and change the built environment. On the 'demand' side, innovative entities are the ones that use the built environment. Such entities include large firms or research institutions, but could also include start-ups or spin-offs. Depending on the case, the types of entities that are involved in creating innovation can vary. The 'demand' side makes use of the 'supply' (the built environment) as the location where they operate their business. This research will specifically focus on how the 'demand' side rates the built environment in relation to their needs and goals, and how the 'steer side' is shaping the built environment in a way that they feel will stimulate innovation. Ultimately this will lead to a comparison as to whether the goals and corresponding actions of the steering actors are in line with the needs and goals of the 'demand' side. The following chapter will further explain the definitions of the concepts in the model.

1.5.2 Concept Definitions

This chapter explains the different concepts that are mentioned in the conceptual model (figure 1) and aims to provide clear definitions for the concepts that will be used throughout this research.

Innovation

Increasing innovation is the main goal of an innovation district. But innovation can be viewed from different perspectives. This research uses the definition of innovation as described by Curvelo Magdaniel (2016) and therefore regards innovation as "the processes of knowledge creation, diffusion and its further application in the development of new and improved technologies".

Built Environment

Theories of architecture describe the built environment as consisting of built forms, created by humans, which provide shelter and define and protect activity (Curvelo Magdaniel, 2016). This research further regards the term built environment as a synonym of real estate, which according to theories in the management of the built environment is seen as an enabler of the activities performed by individuals, organizations and the society (Curvelo Magdaniel, 2016). This research specifically looks at the urban scale and regards this as the scale of the innovation district.

Innovative entity

The innovative entities regarded in this research are companies or research institutions that are located in innovation districts. Furthermore, a condition is that the municipality in which the innovation district is located regards the entity as being an important source of innovation for the district. The type of entity that will be used in this research can differ in scale, meaning that it could range from small start-ups to large, international firms.

Steering actor

The steering actors can be different per case, depending on who is responsible for the development and steering policy in the area. Winden and Carvalho (2015) mention developers, policymakers and managers as possible steering actors, while Curvelo Magdaniel (2016) also mentions universities as being possible actors involved as steering actors in the district.

Policy

Policy is regarded as the way in which the steering actors use their power in order to influence the built environment. This could take the form of regulations or zoning plans set up by municipalities, but could also be the type of office space provided by developers. The policy aspect focuses specifically on the types of actions that relate to the way in which the built environment is used in order to stimulate innovation in the district.

Competitive advantage

Competitive advantage is what the municipality ultimately strives for. Porter (2004) focuses on firms and argues that a firm's relative position within its industry determines whether a firm's profitability is above or below the industry average. Moreover, he emphasizes two main types of competitive advantage: low cost or differentiation. It is this final aspect, differentiation, which this research specifically focuses on. Therefore, this research regards competitive advantage as having unique characteristics that can be used to distinguish the city from other cities. This research specifically focuses on innovation, which is used as a means in order to achieve a competitive advantage. This research does not specifically focus on what the relationship is between innovation and the competitive advantage this would create, but rather sees it as an end goal for stimulating innovation and using innovation districts in order to do so.

PART II

Theoretical Framework

2. Literature review

The literature review aims to provide answers to the issues that are posed in sub-questions **1**, **2**, **3**, **4** and **5**. As these issues are set in an increasingly changing global context, the first chapter will explain some relevant global dynamics and the consequences these have for the contemporary development of cities.

2.1 A globalizing context

This chapter aims to provide an answer to the following sub-question:

1. *"Why is urban competitiveness increasingly important for cities?"*

First, it explains how urban competitiveness has come into play as a consequence of increasing globalization. Secondly, it discusses how this has caused cities to search for a distinctive identity and how they use place branding as a means of achieving higher levels of distinctiveness. Lastly, it discusses how these methods of place branding have an effect on the branding of districts, in particular innovation districts.

2.1.1 Urban Competitiveness

In the contemporary process of globalization, a shift of power can be recognized from central nation states to cities and regions. It appears that metropolitan areas are increasingly functioning as the centres and gateways of global business, culture and social relations. Segbers (2007) formulates two reasons for this. Firstly, he argues that many central state governments are overburdened with a growing task load and rising expectations and as a response are opting to devolve political authority and responsibilities to sub-state levels. Secondly, cities and regions are increasingly becoming sites of self-induced and self-centred economic activities, innovation, and growth independent from the national economic government. Urban regions will increasingly have to profile themselves on the global stage. This seems to lead to a trend in which more and more regions are actively investing in regional economic policy in order to increase their competitiveness and attract and retain their economic activities (Ni & Kresl, 2010). Cooke (2011) argues that the optimal local embeddedness of economic clusters lies within the combination of subcontracting and outsourcing, the composition and scope of the labour market, the housing market and living environment, the accessibility of urban facilities related to culture and services and in the small-scale dynamics of networks of entrepreneurship and spin-offs. As this can be an important distinctive factor for Dutch cities, there lies an opportunity here to profit from this by using appropriate policy. However, it seems that policymakers are generally not thinking enough about the possible benefits of serving as an international hub and are rather focusing on the advantages of clustering in their own hotspots (Van Oort et al., 2006). This reveals an opportunity for Dutch cities to profile themselves on a global stage.

Nowadays, in order for cities to be promoted, they have to take matters into their own hands. Goess et al. (2016) emphasize this and argue that especially city regions – including polycentric urban regions – play an important role in leveraging national and even global competitiveness, while maintaining regional cohesion. In a country like the Netherlands, the competitiveness versus the cohesion between cities plays a significant part in the development of its main cities. Mayer et al. (2016) argue that capital cities play an important role in shaping the political, social and cultural identities of a nation capital. Furthermore, they argue that cities play their role as capitals not only through their symbolic architecture but also through the ways in which these capitals develop a unique regional innovation system (RIS) and through the ways in which they position themselves in the national urban hierarchy through a set of locational policies formulated in local policy regimes. These topics address the need for a local government that is able to deal with these ambitions and can translate them into

appropriate actions in order for the city to increase its global competitiveness. But what makes it important for city regions to market themselves? To be able to compete in an increasingly globalized world, cities are trying to form an identity that helps them to increase their competitiveness. Balancing their priorities, cities have to reinvent the essence of what defines them (Goess et al., 2016). To achieve this, cities and regions often turn to city/region-marketing as a way of forming an (international) identity that speaks to the public and try to form a brand for their city or region. As described here above, city regions are becoming increasingly independent of their national context and are bypassing their governments in their pursuit of placing themselves in a new global configuration (Segbers, 2007). City branding is an important tool for cities to lure new investors, businesses and inhabitants. Cities generally choose a profile that fits existing local factors and expresses how they wish to develop. In the particular case of polycentric urban regions, this revolves around the question how cities specialize in complementary ways, and how they distinguish themselves from their neighbours (Goess et al., 2016). Some go even further and argue that the way in which cities brand themselves and communicate their distinctiveness largely decides which cities succeed and which falter in the race for economic prosperity (CEOs for Cities, 2006). In this search for ways of promoting cities, it often happens that different messages emerge because of the various markets and audiences in cities. In the process of branding for different audiences and markets, it happens that a city brand gets diluted and loses its impact (Turok, 2009). This emphasizes the issue of adopting a brand that has a relation with lower levels of scale within the city. Furthermore, it addresses the issue of authenticity. Many cities around the world are currently promoting themselves as being an 'innovative city', but are they really?

2.1.2 Identity

A clear search for 'identity' can be seen amongst cities and regions in this globalizing context. An identity can be communicated by using place branding strategies. But why is this identity important? Proponents of city branding argue that a positive identity transforms how people think about a place and behave towards it (Anholt, 2006). Recently, the focus on less rational economic explanations for the identity of places has been growing. Verheul (2015) describes this as a 'sense of place', which is about the literal meaning of 'sense' as a 'feeling' as well as about the meaning of 'sense' as a 'human sense'. Zukin (2010) describes the importance of authenticity: "claiming authenticity becomes prevalent at a time when identities are unstable and people are judged by their performance rather than by their history or innate character". Furthermore, she states that "under these conditions, authenticity differentiates a person, a product or a group from its competitors; it confers an aura of moral superiority, a strategic advantage that each can use to its own benefit". This need for authenticity can be linked to the previously discussed critique on place branding and describes the need for a link between a storyline and the perceived environment. Furthermore, Verheul (2015) stresses that "by sharing and comparing experiences of groups of people that happen in different places, the relevant meaning of a place is created. These stories of places form our lives. Urban identity is being expressed through shared stories of individuals and groups". It seems that an identity of a place is very much related to the feeling one has about the place. Although this is a personal experience, places appear to be able to gain a certain reputation by storytelling amongst individuals.

2.1.3 Place branding

The concept of place branding has come into play as a tool for achieving a city's goal of urban competitiveness. Zenker and Braun (2010) have defined place branding as: "a network of associations in the consumers' mind based on the visual, verbal, and behavioural expression of a place, which is embodied through the aims, communication, values, and the general culture of the place's stakeholders and the overall place design". This "positioning" of cities/regions, as described in the previous chapters, forces cities to make a well-argued choice on which aspects of the brand-identity should be emphasized. These aspects should then be relevant to the (potential) target group and should set their brand apart from its competition (Hospers, 2011). Furthermore, there is a need for an

area development strategy or vision for the future on a higher level, on a city- and regional level. Buhrs (2016) distinguishes two concepts central in this: specializing and collaborating. Recently however, several authors have expressed their discontent with the contemporary use of place branding in the development of cities. An example of such a critique on place branding is that it is an instrument that is being used by urban elites in order to legitimize their own strategic decision making (Kavaratzis & Kalandides, 2015). Furthermore, several authors address the need for a connection between the brand and the place and argue that successful place branding cannot be achieved without such a link. Therefore, a place branding image cannot be constructed as a tabula rasa narrative, but should be based on actual physical features and a local identity (Goess et al., 2016). Other authors also recognize this, and argue that the construction of 'fake brands' is destined to low credibility (Vanolo, 2008) and the importance of the physical recognisability, the associations people have related to an area and the connection between the existing identity of the area and the aimed image of the area are essential to be able to attract potential target groups (Dalmeijer, 2014). Hospers (2011) uses the following words: "You should not claim something you cannot prove". These authors all address the need for a sense of credibility. But how to achieve this? Kavaratzis and Kalandides (2015) state that place-branding should be a bottom-up process which complies with the feeling that citizens of the place have about their city or region. The same principle applies to regional place marketing, where cities create a joint image for the benefit of a regional development strategy (Goess et al., 2016). These issues related to place branding are also relevant when it comes to innovation districts. As has been explained in chapter 1, many cities are currently announcing their own innovation districts. But is there a connection between this brand and the physical environment?

2.1.4 Branding an innovation district

The above mentioned authors all seem to agree that a place brand needs physical evidence in order for the brand to be credible. We can link these principles to the main topic of this research; innovation districts. District branding has included the use of urban design elements such as gateway development, communicative digital displays, banners, etc. The recent trend of the 'Silicon Somewhere' (Verheul & Hospers, 2016) has created the perception of a concept that can be copied anywhere in the world. However, simply co-locating innovative firms and start-ups and naming it an 'Innovation District' appears to be insufficient for success in the creation of ground-breaking innovation. It is therefore important for municipalities to recognize this and act accordingly. As has been explained here above, the built environment should support the claim of innovation, otherwise the area is destined to low credibility and the brand will not last. A marketing strategy cannot make up for aspects of a city that are unattractive and discourage people from visiting, investing or moving there. Turok (2009) argues that the success of a place brand depends on improving material conditions, otherwise marketing amounts to a public relations exercise treating the symptoms of the problem rather than the causes. Furthermore, he states that in order to achieve such a link between a brand and the built environment, city authorities have a vital role to play as intermediaries to facilitate these interactions and to help align policies and resources consistently across different elements of the strategy (Turok, 2009). Taking the above into account, it seems that municipalities can use their position to their advantage by stimulating innovation through a brand that has a relation with the physical environment of the area.

2.1.5 Conclusion

In conclusion, it appears that increasing dynamics of globalization are putting more pressure on cities to market themselves and distinguish themselves from their peers. Recently, there has been a growing focus on innovation as a means to achieve high levels of distinctiveness and increase the global competitiveness of these cities. Innovation districts are being put forward as important sources for such high levels of innovation. However, some authors address the issue that such brands should show a relation with the built environment. Municipalities have an important task at hand, as they usually have a significant role in steering the built environment.

2.2 Innovation

This chapter aims to provide an answer to the following sub-question:

2. *"What is already known about innovation of firms and institutions and why is this important for cities?"*

To be able to answer this, this chapter is divided into different sections that will explain the different aspects related to this question.

2.2.1 What is innovation?

In order to be able to understand why cities increasingly invest in innovation, it is important to first understand what innovation means. The word innovation is a combination of two parts: 'in' and 'novation', which, if traced back to the ancient Greek and Roman civilizations ('in' and 'novare'), can be explained as: "introducing something new". As has been described in the concept definitions, this research regards innovation as "the processes of knowledge creation, diffusion and its further application in the development of new and improved technologies" (Curvelo Magdaniel, 2016). However, different authors have described it in their own (similar) ways. Butzin and Widmaier (2016) describe innovation as a spatial and knowledge-intensive learning process that is generated through the interaction of different actors. Katz and Wagner (2014) define it as the situation where new or improved ideas, products, services, technologies, or processes create new market demand or cutting-edge solutions to economic, social and environmental challenges. A similarity between the different definitions seems to be that the authors all consider innovation to be a process where something new is created.

Not only are there a number of definitions for the concept of innovation, it also achieved differently across firms and institutions. Arora et al. (2016) have investigated such pathways for firms in the US and conclude that the sources for innovation are mostly external. What is more, the main channel through which innovation is acquired appears to be cooperative research ventures with other firms, labs or universities[2]. Another important comment to make, is that sources of innovation and channels by which innovation is acquired vary significantly per industry. As explained by Andes (2016), a distinction can be made between two important factors in this regard: Market- versus Non-market Channels and Traditional- versus Non-traditional actors[3]. A pharmaceutical firm, for example, is more likely to acquire innovation through market channels and traditional actors, while software firms generally acquire innovation through non-market channels and non-traditional actors.

2.2.2 Measuring innovation

As can be seen by the different ways in which it is defined, the concept of innovation is not considered to be the same by everyone. This has consequences for the way in which innovation is measured. Different sources use different indicators of measuring innovation. Table 1 provides an overview of different indicators of innovation as described by different authors, composed by Curvelo Magdaniel (2016). Commonly used indicators of innovation are (1) R&D data, (2) data on patent applications, grants and bibliometric data and (3) non-R&D data. Although these indicators are commonly used in practice, they have been criticized for different reasons, as described by Curvelo Magdaniel (2016). The first indicator, R&D data, is criticized for focusing mainly on the measurement of an innovation input, leaving out many other supporting activities. The second indicator, patent data, is criticized for

[2] Important to mention here is that these observations are based on numbers and therefore do not take into account the value of such innovations.

[3] Traditional actors include universities and scientific services consultants, while customers and suppliers are considered to be non-traditional actors.

focusing too much on patents and excluding many firms (especially SMEs) and other organizations that carry out innovative activities. Bibliometric data is criticized for primarily focusing on the dynamics of science rather than innovation.

Lastly, non-R&D data has received criticism because of the variety in definitional restrictions in relation to innovation inputs and outputs in the methods that are used to collect this type of data (Smith, 2005). This indicator was originally adopted for manufacturing, which leads to the question of the extent to which this indicator is also applicable to services. The other indicators focus more on output data, which has consequences for the significance of these indicators in the sense that these can differ in relation to the type of organization. Different organizations can use varying indicators to measure innovation, depending on their core processes and ambitions.

Indicators	Description	Theoretical sources	Use in practice
1. R&D data	This indicator focuses on measuring inputs. Initially focused on the use of datasets resulted from the collection of economic indicators compatible with industrial datasets and the national accounts such as R&D intensity, R&D expenditure, R&D/Sales ratio, R&D/GDP ratio, R&D personnel.	Griffith, Redding, and Van Reenen (2004) Dowrick (2003)	OECD, 1992, 2001, 2002, 2005 European Commission 1992, 1993, 1996, 2011 Global Innovation Scoreboard (GIS), 2008
2. Data on patent applications, grants, and bibliometric data	This type of indicators focuses on measuring outputs. The latter refers to scientific publication and citation turning around the SCI- Science Citation Index.	Granstrand (2005) Kaloudis (1998)	OECD 2002, 2005 European Commission 1992, 1993, 1996, 2011 Global Innovation Scoreboard (GIS) 2008.
3. Non-R&D data (Subject approach)	This focuses on inputs able to pick up small-scale changes in product performance which might have major technologic and economic implications on 'innovation activities' besides R&D, such as design activities, engineering developments and experimentation, training, exploration of markets for new products, equipment acquisition and tooling-up, etc.	Kline and Rosenberg (1986) Smith (2005) Evangelista, Sandven, Sirilli, and Smith (1998)	OECD, 2005 European Commission 1992, 1993, 1996
4. Product innovations identified through exert appraisal and literature (Object approach)	Examples of these indicators are database about technical and business innovations covering sources and types of innovation, industry innovation patterns, cross-industry linkages, regional aspects and so on. These indicators are widely discussed in theory by scholars claiming that traditional measures miss 'the population of innovation outputs which are routine, incremental, part of the normal competitive activity of firms, yet not strikingly new enough to be reported' (OECD, 2005)	Acs and Audretsch (1990) Archibugi and Pianta (1996) Kleinknecht (1996) Pavitt (1984)	N.A.
5. Technometric indicators	These indicators explore the technical performance characteristics of products (output focus). If focuses on detailed ways of measuring technological change.	Saviotti (1996) Saviotti (2001) Grupp (1994) Coccia (2005)	European Commission 1997
6. Synthetic indicators	These indicators cover a large range of subjects that have been developed for scoreboard purposes (input-output focus). 'They take into account the various aspects which constitute the technological capability of a country and aggregate them into a single figure. They are typical macroeconomic indicators aiming at comparing the positions of different countries and their changes. Their merit is to provide a clear and immediate image of a country's ranking, while the drawback is to sacrifice the inherent complexity of the process of knowledge production and distribution'. (Archibugi, Denni, & Filippetti, 2009).	Archibugi et al. (2009)	World Economic Forum, 2003, 2004, 2005, 2006 The European Commission, 2007, 2008 The World Bank OECD, 2006, 2007

7. Databases on specific topics	Developed as research tools by individuals or groups such as collaboration data (output).	Pari Patel and Pavitt (1997) Patel and Pavitt (1999) Hagedoorn and Schakenraad (1990)	OECD, 2001

Table 1. Overview of different ways of measuring innovation (Curvelo Magdaniel, 2016)

These different indicators of measuring innovation reveal the many perspectives of looking at the same concept. To be able to make clear what specific actors are striving for when they want to reach higher levels of innovation, it is important to understand what indicators of innovation they are using to measure it. These types of indicators can vary between different actors (e.g. municipalities and firms) while both are striving for higher levels of innovation.

2.2.3 Why is innovation important for cities?

In contemporary strategies of urban competitiveness, the topic of innovation seems to be playing an increasingly important role. Cities aim at promoting innovation by promoting themselves as being an 'innovative city' and lists such as the Forbes' 'Most Inventive Cities' (Forbes, 2013) are contributing to this development. The well-known example of Silicon Valley as an area of innovation has led to cities around the world attempting to mimic this success. In doing so, cities have assigned several areas for the creation of innovation, leading to the development of the 'Silicon Somewhere' syndrome (Verheul & Hospers, 2016).

Different sources suggest that cities and regions function as 'incubators' of creativity and innovation and that human capital factors in particular play an important role in spurring regional growth (Jacobs, 1961; Lucas, 1988; Park et al., 1925; Thompson, 1965). Lee et al. (2002) argue that entrepreneurial activity requires not only a productive and supportive business climate along with an educated population, but also a climate where creativity, diversity and innovation are encouraged and valued. This encouragement and valuation is where municipalities can play a role in supporting entrepreneurship. Jacobs (1961) explained how cities function as 'open systems' to attract talented people from various backgrounds and stimulate their creative capacities. Furthermore, she argued that open and diverse cities attract more talented people, thus spurring creativity and innovation, which are the underlying forces of entrepreneurship (Jacobs, 1961). This seems to be recognized by municipalities nowadays, as many examples of mixed living/working areas can be recognized in the contemporary urban development plans of large cities. The 'innovation district' that is currently an upcoming concept, also makes use of a mixed environment in order to facilitate growth. Chapter 2.3 will further explain the concept of the 'innovation district' and describes how the clustering of innovation has been subject to an evolution over the past decades.

The change of a global context that has been described in the previous chapters, has also changed the way in which economies work. In the contemporary global economy, innovation, knowledge workers, skills and creativity are important input factors (Van Oort et al., 2006). This brings with it a changing demand of firms for their locations, towards one which focuses more on knowledge milieus. Cities can have an important role in facilitating such a milieu. In the past, it has been assumed that such milieus were mainly to be found in the largest metropolitan regions. However, recently more research is showing that rather medium-sized cities in an urban network are the best places for economic growth (Barca et al., 2012; OECD, 2009, 2011). Medium-sized cities are defined here as urban regions with up to 2 million inhabitants (OECD, 2012). This is particularly relevant for the Netherlands, where its 'Randstad' can be regarded as a poly-centric region with medium-sized cities.

2.2.4 Entrepreneurship

Contemporary regional development strategies are increasingly considering innovative entrepreneurship and new venture creation as the driving forces of regional prosperity (Van Oort & Bosma, 2013). To facilitate the development of start-ups, policymakers are especially focusing on the establishment of regional clusters. It is argued that such agglomerations provide a fertile breeding ground for start-ups and nascent entrepreneurs (Pe'er & Keil, 2013). Such a breeding ground can be beneficial to start-ups in particular, because the entrepreneurs that are the driving force of start-ups create value through the absorption, the transfer and the application of knowledge as well as the corresponding transformation into new economic knowledge (Acs & Plummer, 2005). The creation of new ventures thus appears to be important for the development of the region. It is argued that without new venture creation, policy-induced and promoted cluster creation may lead to excessive tacit knowledge and thus crowding-out effects of private initiatives, leading to a "field of dreams without players" (OECD, 2015).

Several authors (Koster & van Stel, 2014; Luger & Koo, 2005) have written about the influence of start-ups on (regional) economic growth. Koster and van Stel (2014) argue that the effect of start-ups on employment change can be decomposed into an immediate effect and a long-term effect. The immediate effect is that the creation of new ventures creates a demand for employees. The long-term effect is a consequence of the growth of the start-up and the rearrangement process among the incumbent firms. The existing firms are challenged by the new firms and those able to adjust to this development are assumed to strengthen their position relative to other incumbents. As a consequence, this then leads to productivity and employment benefits for the regional economy.

2.2.5 Conclusion

An important conclusion to be drawn from this chapter is that innovation is an ambiguous concept. Different authors use different definitions of innovation, as well as different indicators of measuring it. Some authors are also considering entrepreneurship to be a driving force of prosperity and link this to the innovative power they have. The level of innovation in cities seems to play an increasingly important role in a globalizing world and this can be seen in the way contemporary urban strategies are increasingly considering innovation as a means of achieving a competitive advantage. However, because of the varying indicators that are used to measure innovation, it is important to bear in mind how each actor defines innovation when analysing the strategies they use to achieve higher levels of innovation. What is more, each firm type and economic sector has its own pathways and channels for innovation (Andes, 2016, Arora et al., 2016), which makes it important to discover these for each individual innovation district.

2.3 Innovation Clusters

This chapter aims to provide an answer to the following sub-question:

3. *"What is already known about innovation districts?"*

Firstly, it briefly discusses the history of innovation in relation to the agglomeration of business. Then, it explains how a shift can be recognized from secret, closed-off innovation towards a system where innovation is considered to have more of an 'open' character and is shared more freely. The chapter ends with a brief discussion about different forms of criticism that have recently been spurred in relation to innovation districts.

2.3.1 A brief history

The creation of innovation depends on the potential of firms. Moulaert and Sekia (2003) distinguish three functional spaces for a firm: the production space; the market space; and the support space. When facing uncertainty, it is the support space that should empower an enterprise and it is this space in particular that will determine the relations between corporate innovation and spatial development. The role of this support space can be recognized in the way in which firms agglomerate. Firms locate themselves in close proximity to other firms in order to be able to take advantage of agglomeration economies related to their production process (Clark, 2000). Firms then co-locate in districts (support space), where clusters of firms can be observed. An evolution of this support space can be recognized, starting with the industrial districts in the 19th and 20th century: areas with high concentrations of manufacturing enterprises commonly engaging in similar or complimentary work (Katz & Wagner, 2014). As the 20th century progressed, the nature of manufacturing activity changed and eventually dispersed. In the second half of the 20th century, collaborations of universities, private developers, and government designed and built clusters of labs and firms with the aim of increasing the commercialization of research and attracting entrepreneurially-oriented scientists from industry and academia (Katz & Wagner, 2014). It was in this period that a shift can be observed from industrial districts to science parks, of which there are still many examples left today (e.g. Amsterdam Science Park and Utrecht Science Park). Although highly focused on innovation, these districts (or 'parks') were not designed to evoke collaboration between different companies within the district itself. This development of frameworks such as industry clusters, learning regions and territorial innovation systems has gradually shifted the discussion from co-location of producers to co-location of innovators (Clark et al., 2010). Recently, this has evolved into a new perspective on the concept of co-location.

2.3.2 Open innovation

The contemporary idea of innovation has a much more open character. Rather than being located on the outskirts of cities, innovation districts are embedded within the city's network of transport and amenities. Katz and Wagner (2014) define the innovation district as follows: "Geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators, and accelerators. They are also physically compact, transit-accessible, and technically-wired and offer mixed-use housing, office, and retail". Apart from its location, the main difference with its predecessors is that the innovation district is an area with a mix of functions, including housing and retail. Furthermore, it aims to encourage horizontal contact between firms rather than creating an environment wherein firms mainly focus on themselves and the vertical connections within the firm. This relates to the agglomerating force of informational spillovers. These spillovers relate to the spatial proximity of geographical location where the knowledge is being created. The argument is that it is easier to "rub shoulders" in a more populous area, as information travels via both formal and informal avenues and through the movement of employees from one firm to another (Sedgley & Elmslie, 2004). Boschma (2005) also recognizes this, and states that short distances bring people together, favouring information contacts and facilitating the exchange of tacit knowledge. Maskell (2001) further argues

the role of transparency within clusters, which makes sure that successful experiments by other local firms do not remain unnoticed. Another significant factor of co-location is that firms have more face-to-face contacts and are able to build up trust more easily. This in turn leads to more personal and embedded relationships between firms (Harrison, 1992). The relations that are achieved through local contact are believed to be even more beneficial when supported by nonlocal relations that provide new impulses and ideas and bring new variety into the territory (Bathelt, 2005).

2.3.3 Criticism

A critical note has to be mentioned however. In the past twenty years, there has been an ongoing discussion about the benefits of agglomeration and whether this way of concentrating businesses and creating sectoral diversity in clusters is a good thing in terms of knowledge spillovers and economic growth. For this reason, Frenken et al. (2007) argue that the debate about specialization versus diversity is not appropriate and that the focus should rather be on the concept of related variety. This means that the types of businesses in a cluster should be diverse, but should have related characteristics that allow them to learn from one another. Furthermore, several authors have questioned the importance of geographical proximity in relation to collaboration and knowledge exchange (Boschma, 2005; Breschi et al., 2003; Gertler, 2003). The main argument that is being put forward is that 'simple' co-location is neither a prerequisite nor a sufficient condition for collaboration (Boschma, 2005). Although the geographical proximity of firms does facilitate interaction and cooperation, advanced information and communication technologies can create networks through which learning can also take place. The leading trend amongst municipalities, however, seems to be towards a co-location of firms and the creation of an innovative milieu.

2.3.4 Conclusion

Globally, a shift can be recognized from closed-off science parks outside the city towards more urban contexts as a source for innovation. Where in the past innovation was considered to be created in secretive environments, it now increasingly seems to be considered as having an open character. Such 'innovation districts' are characterized by urban settings and a high level of walkability. However, several authors have expressed their criticism and it is important to bear in mind these points of attention when conducting the research. As Boschma (2005) argues, simple co-location does not automatically stimulate the collaboration between firms. When analysing the cases, it will be essential to see whether municipalities are recognizing this and are doing more than just co-locating innovative entities.

2.4 Policy towards innovation

This chapter aims to provide an answer to the following sub-question:

4. *"What is already known about stimulating innovation through municipal policy?"*

The first section will explain the concept of the Regional Innovation System (RIS). The second section goes more into depth about what is being done by municipalities in order to create an innovative milieu. The final section explains the different roles that municipalities can adopt in the realization of an innovative milieu.

2.4.1 Regional Innovation System (RIS)

Due to the remarkable performance of high-tech clusters in the United States (e.g. Silicon Valley) and the growing importance of innovation in relation to urban competitiveness, policymakers are focusing more on industrial clusters and their geographical location. Rather than executing national policies, a trend can be recognized in which the strategic management of places has become the leading device in industrial public policy (Caiazza et al., 2015). As municipalities have a steering role in the development of the city, they have the possibility of adopting a strategy that fits the development of innovation. Therefore, cities aim to set up a well-functioning regional innovation system (RIS). An RIS can be seen as a regional system "in which firms and other organizations are systematically engaged in interactive learning through an institutional milieu characterized by embeddedness" (Cooke et al., 1998). Doloreux (2002) emphasizes the expression "interactive learning", the term "milieu" and the concept of "embeddedness" in the definition of the RIS. Furthermore, he argues that firms, institutions, knowledge structures and holistic innovation policies are the main elements that comprise the RIS (Doloreux, 2002).

2.4.2 Creating an innovative milieu

As has been mentioned in chapter 2.3, cities are increasingly aiming at mixed urban areas. It appears that it is becoming known that downtowns and their surrounding areas are becoming important breeding grounds for economic activities (Hutton, 2008). Therefore, it is not strange that in many contemporary urban regeneration projects, there is a clear aim for mixing living environments with business. By implementing this idea of mixing work and living, such a strategy could then serve an economic as well as a social purpose in the sense that it would improve the liveliness of the streets and the sense of safety in the area (Hospers, 2006). Katz and Wagner (2014) refer to the city of St. Louis as an example of where a city's or metropolitan area's distinctive economic strengths helped orient actors to the clusters that have the best chance of success rather than rely on a government's attempt to pick industry winners. This implies a strategy where an environment is created in which actors are attracted to the area for its characteristics, rather than attempting to manufacture an environment by picking the right firms for the area. This emphasizes the need to transform the physical landscape of innovation districts to create favoured attributes of complexity, density, and mixed uses and activities (Katz & Wagner, 2014). Crevoisier (2011) puts it as follows: "Actors in interaction produce the territory, but one should not lose sight of the fact that the territory shapes the actors, including their rationality". However, Simmie (2005) emphasizes that "explanations slip too easily into the argument that the innovative milieu assist innovative firms while at the same time the presence of innovative firms creates the innovative milieu that is supposed to be assisting them". This clearly indicates a lack of clarity within the creation of innovative districts and how to attract the actors that produce innovation.

According to Katz & Wagner (2014), these types of districts where innovation is shared amongst the actors located in the area, consist of three types of assets: Economic-, Networking- and Physical assets. The physical assets consist of 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. Innovation districts reach their potential when all three types of assets, combined with a supportive, risk-taking culture, are fully developed, creating an innovation ecosystem (Katz & Wagner, 2014).

2.4.3 Role of the municipality

The active engagement and involvement of government and states could accelerate the growth of districts, provided it respects the organic and differentiated nature of this trend. Katz and Wagner (2014) distinguish three important roles for municipalities: spurring innovation and entrepreneurial growth, financing land and infrastructure improvements, and boosting human capital. This type of policy is important in a time of rapid changes and competing cities, which makes it crucial to be able to adapt. This ability to adapt is also recognized by Clark et al. (2010), who argue that the resilience of regions and cities not only depends on endowments (producers, networks, skilled labour and strong institutions) but also on capacities (influenced by policy) to leverage innovation in response to changing technology, markets and resource environments. Innovation districts therefore require specific policy in order to achieve the innovative status it proclaims to be. For instance, municipalities could fulfil a facilitating role, in which they aim at bringing together the different types of organizations (Nooteboom & Stam, 2008). Casper (2007) further emphasizes a steering role by stating that different locations within cities are developing themselves as a consequence of the dynamics of the market and it is the government's job to steer these developments. Clark et al. (2016) make a distinction between the different stages of development of an innovation district (start-up, activation and maturing) and have identified different roles for both the public and private sector in each phase. According to Clark et al. (2016), a leadership vision is particularly important from the public sector in the start-up phase of the district. In a more general context, Adams and Tiesdell (2010) argue that the place promotor is required to "champion and engender an explicit culture of place-making which turns what might otherwise be a series of separate development project into somewhere distinctive that works successfully as a whole".

2.4.4 Conclusion

Municipalities have an important role to play in the development of innovation districts, as they often are able to facilitate development in the area and are responsible for the public space. However, because of the significant role of the market in innovation districts, it will be necessary for municipalities to find a balance between facilitating as well as steering the market. Particularly in the start-up phase of the district, the municipality has a leading role where a vision needs to be put forward to create commitment amongst the variety of actors in the district (Clark et al., 2016; Adams & Tiesdell, 2010). After this has been achieved, the physical assets (as described by Katz and Wagner, 2014) can be leveraged to stimulate innovation and facilitate firms, while at the same time zoning plans can be used to steer development in the area.

2.5 Innovative entities and the built environment

This chapter aims to provide an answer to the following sub-question:

5. *"What is already known about the general physical characteristics of innovation districts?"*

The first section explains the different actors that have been mentioned by previous research as being regarded as sources for innovation. The second section further elaborates on the general physical characteristics of innovation districts that have been distilled from literature.

2.5.1 Actors in innovation

As has been described in the previous chapters, a trend can be recognized in which innovative firms and institutions are moving towards urban locations, where a mixture of amenities and people is available. In order to be able to understand the dynamics in the creation and daily use of an innovation district, it is important to know which actors are 'involved' in an innovation district. Involved in this case means that the actors is either operating on the steering side, influencing the built environment, or on the demand side, making use of the built environment. Several authors (e.g. Curvelo Magdaniel, 2016; Winden & Carvalho, 2015, 2016) mention different actors involved in both sides of knowledge locations. On the steering side, the municipality plays an important role in setting up regulations and land-use plans in order to steer the built environment. As has been explained in chapter 2.4, the policy of municipalities is an important factor in the creation of innovation districts. However, not only municipalities are involved on the steering side of innovation districts. Municipalities, although in many cases the leading actor of the district, is often not the main land/building owner of the district. Therefore, the municipality is in many cases dependent on other actors for filling in the available land. Developers and managers are therefore also mentioned (Curvelo Magdaniel, 2016; Winden & Carvalho, 2015, 2016) as important actors in steering the built environment.

On the demand side of innovation districts, the users of the built environment, different actors are involved. Firms and universities are mentioned by Curvelo Magdaniel (2016) and Winden & Carvalho (2015, 2016) as being sources of innovation that are located in such knowledge locations. Firms, a general concept, could be anything from start-ups and spin-offs to large, international firms. Universities are also regarded as an important source of innovation. Within universities, different research groups can be distinguished that are responsible for a variety of innovative research. Another important actor regarded as a source of innovation is the group of research institutions that operate independently from universities. Actors operating on the demand side of innovation districts have specific demands regarding the built environment they use as a location where they operate their business. The following chapter will explain different topics that have been mentioned in previous research by such actors.

2.5.2 Physical aspects

Previous research (Curvelo Magdaniel, 2016; Winden & Carvalho, 2015, 2016) has revealed several aspects of the built environment that are mentioned by actors operating on the demand side as having an influence on the stimulation of innovation. Generally, we can distinguish the following categories: Infrastructure, Functions and Amenities, Design and Image. An example of a topic that is mentioned in the category of infrastructure, is the quality of public transport in and around the area. Because of the urban setting of innovation districts, the quality of public transport could be an important issue as many workers don't use a car to reach their office or work location. Another example in the category of instrastructure is the 'walkability' of the area. This topic, also mentioned by Katz and Wagner (2014), is considered as an important factor for stimulating innovation as it increases the opportunity of random encounters with other people. 'Functions' refer to the variety of uses a place can offer (e.g. difference between day and night activity). 'Amenities' are considered to be places such as coffee bars

and restaurants, but also retail and parks. This category can be related to the theory regarding 'third places' (e.g. Oldenburg, 1989; Jeffres et al., 2009 and Mehta & Bosson, 2010) wherein 'home' and 'work' are considered to be respectively place number one and two. 'Proximity of resources' refers to the proximity of high-skilled employees, as well the presence of people to do business with. The 'Design' of the district refers to the extent to which the built environment is made of materials or shapes that are inviting and welcoming, as well as to the modularity/flexibility of the built environment (e.g. flexible office space). Finally, the category of the 'Image' refers to the attractiveness of the area and the reputation (e.g. media coverage) the district has. These aspects are further explained in chapter 3.2.4.

2.5.3 Conclusion

This chapter has revealed several actors that are generally involved in innovation districts. Furthermore, it has mentioned several physical aspects of knowledge locations that are appreciated by innovative entities. These actors and aspects will act as a base from which data can be gathered by performing an empirical analysis on the different actors involved in the cases. Chapter 3 will further elaborate on this and will explain how the different aspects of the built environment will be used as topics that guide the empirical analysis.

3. Research design & Methodology

This chapter explains the design that will be used to conduct this research, as well as the different methods that will be used to gather data during the empirical analysis. Furthermore, it provides a set of criteria that has been used to select the case for this research.

3.1 Research design

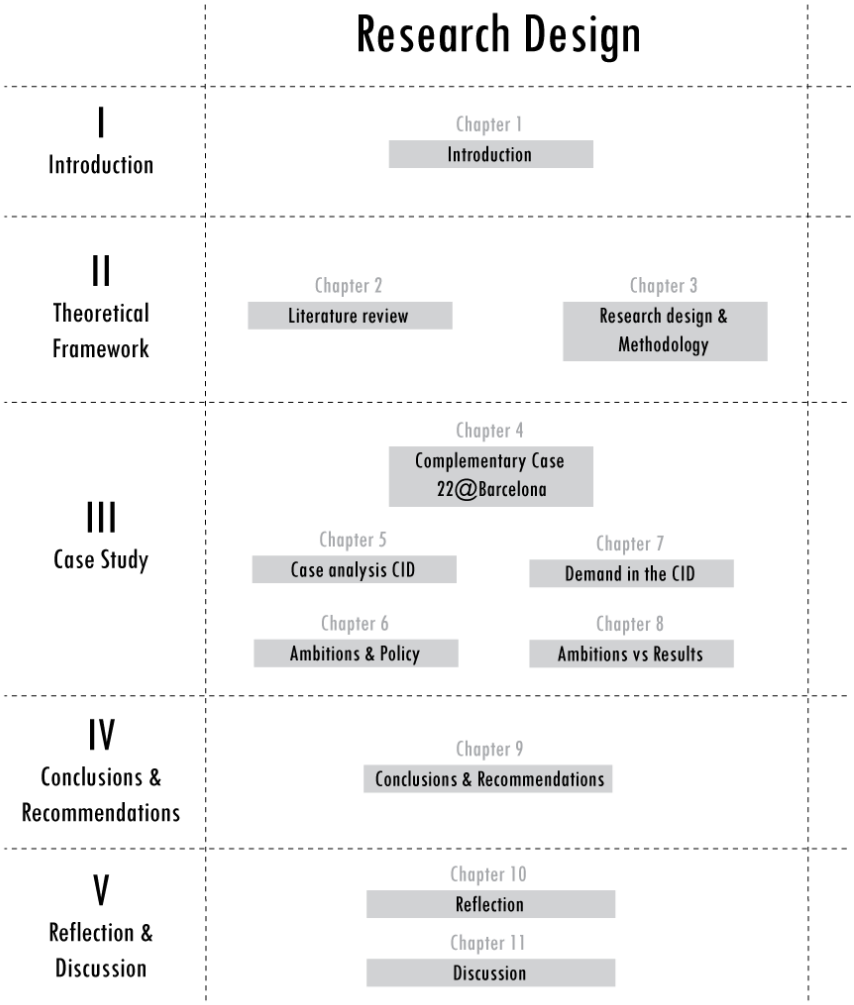


Figure 2. Research Design

Figure 2 provides an overview of the research design that has been used as a structure for this research. It shows how this report has been structured, as well as how the different elements of information together funnel towards the conclusions of this research (chapter 9).

3.2 Research Methods

This chapter explains the different methods that will be used to conduct the research. It explains the role of the literature review, as well as a motivation for using a case-study analysis.

3.2.1 Literature review

The first part of the literature review consists of an analysis of the main concepts that are relevant to this research. The objective of the literature review is to create an understanding of the different

concepts and to provide a basis for the empirical part of the research. It is used to gain a set of topics that can be used throughout interviews with different actors that are involved in the cases.

3.2.2 Case study

For this research, a case study strategy has been chosen to obtain empirical data about the research questions. This research is particularly well-suited for a case study, because of municipalities' particular interest in innovation districts as being designated areas for innovation. Although there appears to be a significant amount of literature available on the topics that are relevant to this research, there appears to be less research available about the physical aspects of innovation districts.

Yin (2014, p. 18) defines case studies as "empirical inquiries that investigate a contemporary phenomenon (the "case") in depth and within its real-world context". This research attempts to create an understanding of the dynamics in the case, more specifically how the actors involved in the case respectively shape and rate the built environment in innovation districts.

Because of the limited time available for conducting this research, a decision had to be made regarding the balance between the scope versus the depth of this research. In order to be able to compare different approaches, while still being able to reach a certain amount of depth, this research will focus on two cases. Therefore, this research can be regarded as a single case study (Bryman, 2012), in which one case will be explored in detail in order to be able to come to an in-depth understanding of the case. The objective is to gain an understanding of the different mechanisms that are being used to steer the built environment, as well as the level of importance and the rating of different of the built environment by the actors on the demand side.

3.2.3 Case Selection

This chapter provides a set of criteria that has been used in order to select the case for this research.

Location

The significant amount of examples of innovation districts around the globe provide many options for research. Considering issues concerning the availability of data, language barriers and the availability of approachable actors, this research will specifically focus on an innovation district within the Netherlands.

Size

Although this research does not set up a specific requirement regarding the size of an innovation district, it does require the size of the district to be of an area level. Furthermore, it specifically looks at the district, rather than the city as a whole.

Actor involvement

Because of the structure of this research, the case to be used should show a strong involvement by the municipality in terms of steering the district. Furthermore, in order to be able to obtain empirical data about the built environment, there should be actors available in the area that are regarded by the municipality as sources of innovation.

Phase

The innovation district should either be in an advanced state, or in a phase where significant investments in the area are currently being done. In that sense, this criteria excludes districts that have been mentioned in policy documents, but where no actions have yet been undertaken.

Data availability

Considering the time frame of this research as well as the level of depth this research attempts to reach, an important criterion is the availability of data and actors to approach for interviews.

3.2.4 Data gathering techniques

To be able to obtain the necessary amount of empirical data for this research, interviews have been performed with different actors involved in the case. A distinction can be made between actors operating on the steering side (see conceptual model, chapter 1.3) and actors operating on the demand side. This difference in actors also requires a different approach regarding the type of interviews that are to be conducted.

Actors operating on the steering side will be questioned by using a semi-structured interview. Bryman (2012, p.212) describes this type of interview as "a context in which the interviewer has a series of questions that are in the general form of an interview schedule but is able to vary the sequence of questions". This type of interviewing has been chosen because of its slightly more open character compared to the 'structured' interview (further explained below). Actors operating on the steering side will be asked about specific topics (explained in more detail below), but the interview will allow space for the interviewee to address specific actions regarding the physical environment of innovation districts that are important to them.

The other group of actors, the demand side, have been interviewed by using interviews with a more structured character. Therefore, a questionnaire has been developed which has been distributed amongst different groups of actors in the district. Bryman (2012) describes the aim of a structured or 'standardized' interview to be that all interviewees are given exactly the same context of questioning, meaning that each respondent receives exactly the same interview stimulus as any other. The goal of these questions is to obtain an understanding of what is important to actors operating on the demand side and how they rate the current built environment of the innovation district they are located in.

Finally, several events have been attended that have a relation with the innovation district in The Hague. Please refer to the appendix for a full overview of these events.

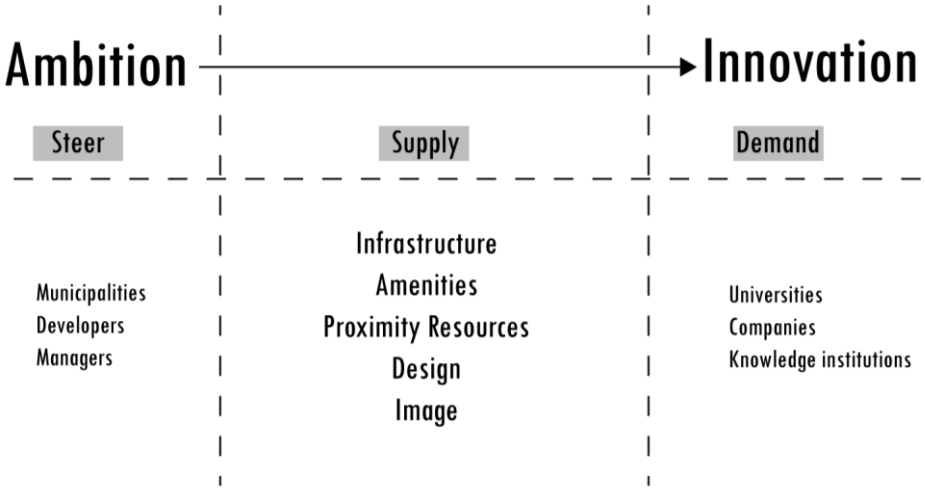


Figure 3. Operational model

Figure 3 provides an overview of how the above has been operationalized. The actors that are responsible for steering the built environment are located on the left, while the actors that are

responsible for creating innovation are located on the right. The figure regards the situation as the presence of an ambition from the municipality to reach higher levels of innovation. Ultimately, the actors on the steering side are not the ones responsible for creating innovation, however. In order to see how the demand side rates its current built environment, several aspects have been distilled from literature (Curvelo Magdaniel, 2016; Katz & Wagner, 2014; Winden & Carvalho, 2015, 2016) that have been mentioned by innovative entities as playing a role in the process of innovation. These aspects have been used as a list of topics in the questionnaire that has been distributed among the demand side. Furthermore, the steering side has been asked to what extent they are considering these aspects in their innovation district. The steering side has also been asked about what their current goals are in relation to the district and in what sense they steer the built environment in a way that complies with their goals. By asking both sides about their goals and needs, this research will be able to determine whether or not the different sides are in line with one another. Table 2 further specifies the different aspects that will be questioned in the different categories that have been mentioned here above.

Infrastructure	Amenities & Resources	Design	Image
Diversity of infrastructure	Flexible facilities	Design of built environment in terms of being inviting and welcoming (e.g. transparent and light materials)	Uniqueness of identity
Pedestrian oriented infrastructure	Access to diverse amenities/functions	Modularity, standardization and openness of buildings	Quality of place (attractiveness)
Public transportation	Public and semi-public meeting and working places		International reputation (media coverage)
Physical connectors	Mixed-use buildings		Geographic features
Linking anchor institutions to district	Exhibition and piloting space, showrooms		
Connection district with broader metro	Shared facilities		
	Venues for training & education, cultural events & entertainment		
	Small scale parks & plazas		
	Mixed-income housing		
	Neighbourhood-serving retail		
	Affordable space for start-ups		
	Digital-accessibility		

Table 2. Categories and aspects of the built environment used in this research (based on Curvelo Magdaniel, 2016; Katz & Wagner, 2014; Winden & Carvalho, 2015, 2016)

3.2.5 Coding and Data Analysis

As described by Bryman (2012), coding can be defined as "a process whereby the data are broken down into their component parts and those parts are then given labels". He further states that it is up to the analyst to search for "recurrences of these sequences of coded text within and across cases and also for links between different codes" and that the objective is to "link the process of making sense

of the data with the research questions that provided the starting point […] and also with the theoretical ideas the authors use to illuminate the issue" (Bryman, 2012).

In order to be able to analyse the data of both the interviews and the questionnaire, different methods have been used.

Interviews
For the interviews, the following topics were leading in all interviews:

What is innovation in the district?;
What are the main ambitions for the district?;
How will these ambitions be realized and translated into physical interventions?

In order to analyse the data of these interviews, the following codes have been used:

Definition of innovation; Infrastructure; Functions & Amenities; Design; Image; Other.

This set of codes and the corresponding data have subsequently been used to analyse the data and create an overview of the ambitions and policies of the municipality of The Hague. The code "Definition of innovation" has specifically been used to analyse whether the different departments in the municipality share a similar vision towards the definition of innovation in the district.

Questionnaire
In the case of the questionnaire, the data has automatically been organized because of the structure of the questionnaire. In order to come to conclusions regarding the levels of importance and rating of the different aspects, a distinction has been made in the different groups of actors that form part of the population of the district. The following groups have been used to analyse the data of the respondents of the questionnaire:

Students; University Staff; SMEs; Start-ups

Although more types of actors have been identified in the district (see chapter 7), the amount of respondents of these groups were significantly higher than other groups and have therefore been used to draw conclusions from. These groups have subsequently been used to identify the aspects with respectively high and low levels of importance. Hereafter, the respondents of the questionnaire have been divided into sub-areas based on their location in the district. Conclusions have then been drawn concerning the results of each of these sub-areas.

The grand majority of questions in the questionnaire are based on the principle of the Likert-scale (Jamieson, 2004). This has some implications for the statistical analysis of the data, which will be further elaborated on in the following chapter.

3.2.5. Statistical Analysis
In order to analyse the data provided by the questionnaire, a statistical analysis has been performed. As explained by Jamieson (2004), the data provided by a Likert-scale questionnaire is ordinal. This has several consequences regarding the options for data-analysis that can be used. An appropriate method for the analysis of such data is to draw conclusions by generating the Inter-Quartile Range and the Median of the total responses for each variable (Field, 2013). Then, by developing frequency tables, a more detailed perception is generated and differences between variables can be made visual. Finally, by performing Chi-square tests and Pearson's R tests (Field, 2013), respectively significant differences between sub-groups and significant correlations have been analysed.

PART III

Case Study

4. Complementary case: 22@Barcelona

4.1 Introduction

This chapter introduces the innovation district 22@ in Barcelona as a complementary case to the innovation district in The Hague. The main purpose of this chapter is to provide the reader with an understanding of an innovation district where the municipality has played a considerable role in the development of the district and explain what the main interventions have been in the process of developing the district into an innovation district.

Figure 4. The 22@ innovation district in Barcelona, Spain

From industrial centre to innovation hub

Poblenou, the area in which the 22@ district is located, used to be part of the former municipality of Sant Martí de Provençals. In 1897, this municipality (including Poblenou) was incorporated into the City of Barcelona. Poblenou soon became the industrial hub of Barcelona and showed particular strengths in the field of textile. Later, mechanical, chemical and food-processing industries started settling in the district and because of its importance as an industrial centre, it became known as the "Manchester of Catalonia" (López et al., 2011).

In the period of 1963 to 1990, over 1,300 industries left Poblenou, causing Barcelona to lose around 250,000 jobs in the industrial sector (Duarte & Sabaté, 2013). After this period, the area was left with mostly transport-related activities occupying the majority of the space. The area gradually became abandoned and started deteriorating. In the 1980s, the district became a popular place among artists and new activities started to develop.

In 2000, the City Council of Barcelona (led by Mayor Joan Clos), established a municipal company to pilot the project '22@ Barcelona' in Poblenou. The project had three main objectives. First, the municipality aimed to regenerate the traditionally industrial neighbourhood into a 21st century neighbourhood. This was achieved by investing in the urban environment with improved transportation, parks, leisure amenities, broadband telecommunications, renewable energy, sustainable pneumatic garbage collection and public equipment (Morrisson, 2015). The second objective was to attract high tech industries in five selected clusters: media, information and communication technologies (ICTs), medical technologies, energy and design (Duarte & Sabaté, 2013). These sectors were selected by following a top-down strategy of governance on the basis of potential growth of prior capabilities (Battaglia & Tremblay, 2011). The third and final objective of the project was to make Barcelona a leading centre of scientific and technological production in the knowledge economy.

4.2 Case Analysis

In order to achieve its ambitions, the municipality of Barcelona used several tools to intervene in the development of the district. The following sections will briefly elaborate on each of these tools. A distinction has been made between physical and economic/institutional interventions.

4.2.1 Physical Interventions

For the 22@ project, the urban planning framework (see figure 5) consisted of four main goals: Fostering the development of new activities through urban regulations; creating diversity; encourage density and generating a good quality of life. In order to achieve these goals and attract investment, incentives were set up for both developers and private owners to build new spaces by increasing the construction rights per square meter of land owned under the condition that the new activities developed are knowledge intensive (Barceló & Guillot, 2013). These rules were part of the MPGM22@ plan, which aimed to change the district from '22a' to '22@'. According to this set of rules, the developer has to transfer 30% of the built area to the city (Barcelona, 2000) and co-finance the infrastructure in the area (Special Infrastructures Plan). Of that 30%, the city allocates one third to social housing (10% of the total built area), one third to 7@ amenities (10% of the total built area), and one third to green spaces (10% of the total built area) (Barcelona, 2000). Using this strategy, public and private interests were balanced. Benefits for the private sector included more productive uses (towards a knowledge economy), higher density and leading infrastructures. Public benefits included more facilities, subsidized housing, green area and eventual opening of streets. Moreover, through the use of the above mentioned construction incentives, the municipality planned the realization of 4,000 subsidized housing units (Barcelona, 2015).

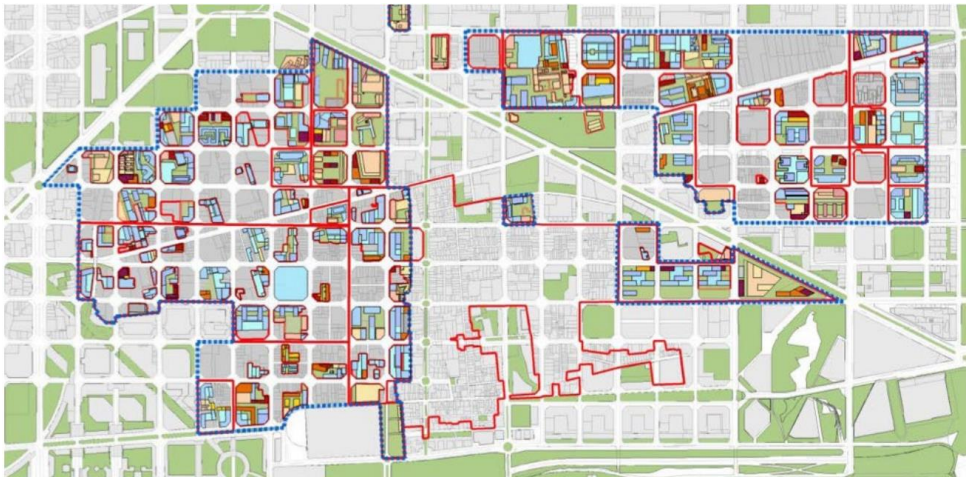


Figure 5. To create the innovation district in Barcelona, the city combined planning with creative zoning tools to increase density, a new mix of uses, and dedicated property for new innovation spaces.

The Special Infrastructures Plan (PEI) has been set up by the municipality of Barcelona as a tool to improve the infrastructure in the district. It consisted of several elements, namely: New mobility plan; Public space renewal; New energy networks; Selective pneumatic waste collection; New heating and cooling system; Underground galleries. Through a combination of public and private investments - 60% by landowners, 10% by the city council, 30% by the city's public service operators (Oliva, 2003) - the municipality has been able to significantly enhance the infrastructural system of the district and improve public spaces. The main focus of infrastructure was on walkability and the use of bikes and public transport rather than the use of cars.

As explained here above, amenities in the district were realized through the incentives for construction. This agreement included that 10% of the total built area should be reserved for spaces for collaboration, also known as '7@ Amenities'. The 7@ amenities are defined as centres of diffusion of new technologies (Barcelona, 2000). The 7@ amenities' mission is twofold. First, they aim to prevent a digital divide by diffusing new technologies to the population (Oliva, 2003). The "7@" are designed for the population at large. Second, they aim to be spaces to foster innovation through collaboration (Barcelona, 2015). The activities that take place in the 7@ amenities, or '@ activities', were chosen according to the knowledge-intensive activities as classified in the OECD working paper on science, technology, and industry, published in 1991 (Trullén, 2011)and are characterized by an intensive use of ICT, a high employment density (workers per surface), the generation of knowledge, the high value added, and their urban features (Barcelona, 2000).

Another significant part of the 22@ transformation plan, was the process of preserving historical buildings in the district. This process was known as the Modification of the Special Plan for Historical/Artistic Architectural Heritage carried out in three phases. First, and industrial census was created through field research. Then, an inventory was created through which the most significant elements were gathered that had enough importance to be maintained totally or partially. Finally, a template file was designed that gathered the elements that formed part of the 'Special Plan'.

Barcelona Urban Lab was created to foster the use of the city as an urban laboratory. Through this project, the city has been made available to companies with innovative projects to test their infrastructures and services for the future in a real environment (Barcelona, 2017). The Urban Lab is used as a tool to facilitate the use of public spaces in the city of Barcelona to carry out tests and pilot programs on products and services with an urban impact, which are in the pre-market stage and in line with the Barcelona City Council's aims, priorities and lines of action (Barcelona, 2017).

4.2.2 Economic/Institutional interventions

The 22@ project focused on four specific economic sectors for its development: media, ICT, medical technologies and energy. In 2008, the design cluster was added to this list (López et al., 2011). These clusters were selected by using a top-down strategy of governance on the basis of potential growth and prior capabilities (Battaglia & Tremblay, 2011). This strategy was chosen to support the cross-fertilization of the companies and create additional intellectual synergy (Morrisson, 2015). By advising companies belonging to one of the five clusters to locate in the pre-defined areas, the municipality attempted to steer the location of these companies and strengthen its clusters.

The main network for companies and institutions in the district is the 22@Network. It was set up under the leadership of the City Council of Barcelona, The Association of Companies and Institutions. Currently, the network includes 104 companies and is governed by the General Assembly and the Board of Directors (Barcelona, 2015). The 22@Network offers a variety of services to its partners: from general services such as discounts in the use of certain spaces, facilities or services to more specific ones, such as the 22@Breakfast, where partners are informed each month about the district's news and topics relevant to their profiles (Barcelona ,2015).

The municipality of Barcelona has set up a municipal company specifically for the development of the 22@ district: 22 Arroba BCN. This company was used as a management instrument with its own legal status and gathered all the necessary instruments for rebuilding the district. This included the overall management and promotion of the district. This company has been responsible for the most strategic content of the project, including directing the district towards the knowledge economy and deciding on the suitability of the profile of new companies (Barcelona, 2015).

A decisive factor in the development of the district has been the leadership of the municipality. As mentioned by (Morrisson, 2015), the physical, economic and social characteristics inherent to an area like 22@ present particularly complex challenges and processes for those exercising political and technical leadership of the process. According to Barber and Pareja Eastaway (2010), planning that combines economic vitality with social and environmental sustainability requires sophisticated leadership and a proactive approach.

A noteworthy aspect in the creation of the 22@ innovation district, has been its adoption of a specific definition for the term 'innovation'. For the 22@ project, the municipality adopted the European Commission's definition of innovation. The European Commission defined innovation in 1996 as: "the commercially successful exploitation of new technologies, ideas or methods through the introduction of new products or processes, or through the improvement of existing ones; innovation is a result of an interactive learning process that involves often several actors from inside and outside the companies" (European-Commission, 1996).

Finally, the 22@ Barcelona model is based on the triple helix model of innovation, in which companies, universities, and public institutions work together to achieve breakthrough innovation (Etzkowitz & Leydesdorff, 2000). This model combines the public and private sector and relies on education for the provision and support of new talent, which in turn will attract new firms and institutions.

4.2.3 Conclusion

Table 3 provides an overview of the actions undertaken by the municipality in the creation of the 22@Barcelona innovation district. As physical and economic/institutional interventions are related to one another in the process of creating an innovation district and to be able to provide a more holistic view on the case, the table shows both types of interventions. It can be concluded that the municipality of Barcelona had a significant role to play in the development of the district and has adopted a proactive approach in steering the district to the municipality's preferred direction. Decisive interventions on the physical side have been the plan for construction incentives, the Special Infrastructures Plan, the 7@ amenities, the heritage preservation plan and the use of the district's public space as an urban lab. On the economic/institutional side, important interventions have been the district's focus on specific economic clusters, the creation of the 22@Network and the construction of the municipal company 22 Arroba BCN. Moreover, the municipality's definition of innovation, its adoption of the triple helix model and its proactive approach have been important in creating a clear direction for the district.

22@Barcelona	
Physical interventions	Economic/Institutional interventions
• Construction incentives (MPGM 22@) • Special Infrastructures Plan (PEI) • 7@ Amenities • Heritage preservation • Urban Lab	• Clusters • 22@Network • 22 Arroba BCN • Definition Innovation • Triple Helix • Proactive approach

Table 3. Overview of physical and economic/institutional interventions in the 22@ district in Barcelona, Spain.

5. Case analysis: Central Innovation District The Hague

5.1 Introduction

5.1.1 Chapter aim

"*A first step on the way to handling uncertainty in order to arrive at an approach to the problem, is to map its nature and causes*"

- Koppenjan and Klijn (2004)

With this quote in mind, the aim of this chapter is to provide an understanding of the Central Innovation District (CID) in The Hague and its context. The CID is located in between The Hague's three main train stations: Central Station, Hollands Spoor and Laan van NOI. This chapter will further explore the different sources of innovation in and around the district and the physical as well as non-physical aspects that contribute to the innovation climate. Furthermore, this chapter will briefly explain the context of the city of The Hague and how it has developed into "the city of Peace and Justice". In order to be able to provide the reader with a clear understanding of the case, the following additional questions will be used and answered within this chapter:

How has the CID developed? Why has the city of The Hague chosen this location to realize an innovation district?

Who are the actors involved in the development of the CID?

What physical interventions have been done in the district to stimulate innovation?

5.1.2 Approach and methods

Although the analysis of the case focuses on the physical aspects of the district, it also discusses economic and institutional aspects to provide an overview of the different forces in play. Within this research, the built environment is regarded as a catalyst for innovation. Therefore, this research does not regard the built environment as a direct input of the processes for innovation, but rather as a catalyst for the inputs of innovation (Curvelo Magdaniel, 2016).

This research further regards the innovation district as the location where innovation takes place. The innovation district can therefore be considered as the unit of analysis. By analysing the case from different perspectives, this research aims to provide an answer to the main research question of this chapter.

5.1.3 Conceptual Framework

In order to be able to analyse the case, the conceptual framework will be used as developed by Curvelo Magdaniel (2016). This model (see figure 6) makes a distinction between input and output indicators. The difference between these will be further explained. Input indicators focus on the aspects that create the conditions required for the processes of knowledge creation and diffusion (Curvelo Magdaniel, 2016). The different aspects of the built environment each have their own function in supporting the process of innovation and complements the other functions. This means that each aspect of the built environment in this model is regarded as a necessary, but not a sufficient condition for stimulating innovation. The output indicators are the measurable targets that are delivered through the processes of knowledge creation, diffusion and its application in the development of technologies (Curvelo Magdaniel, 2016). These outputs have been discussed in chapter 2.2.2, where it has been demonstrated that innovation is measured differently by different organizations.

This research focuses on the input indicators (the built environment) and this chapter will therefore analyse the aspects of the built environment of the case (the CID in The Hague) that can act as an input for the support of the process of innovation.

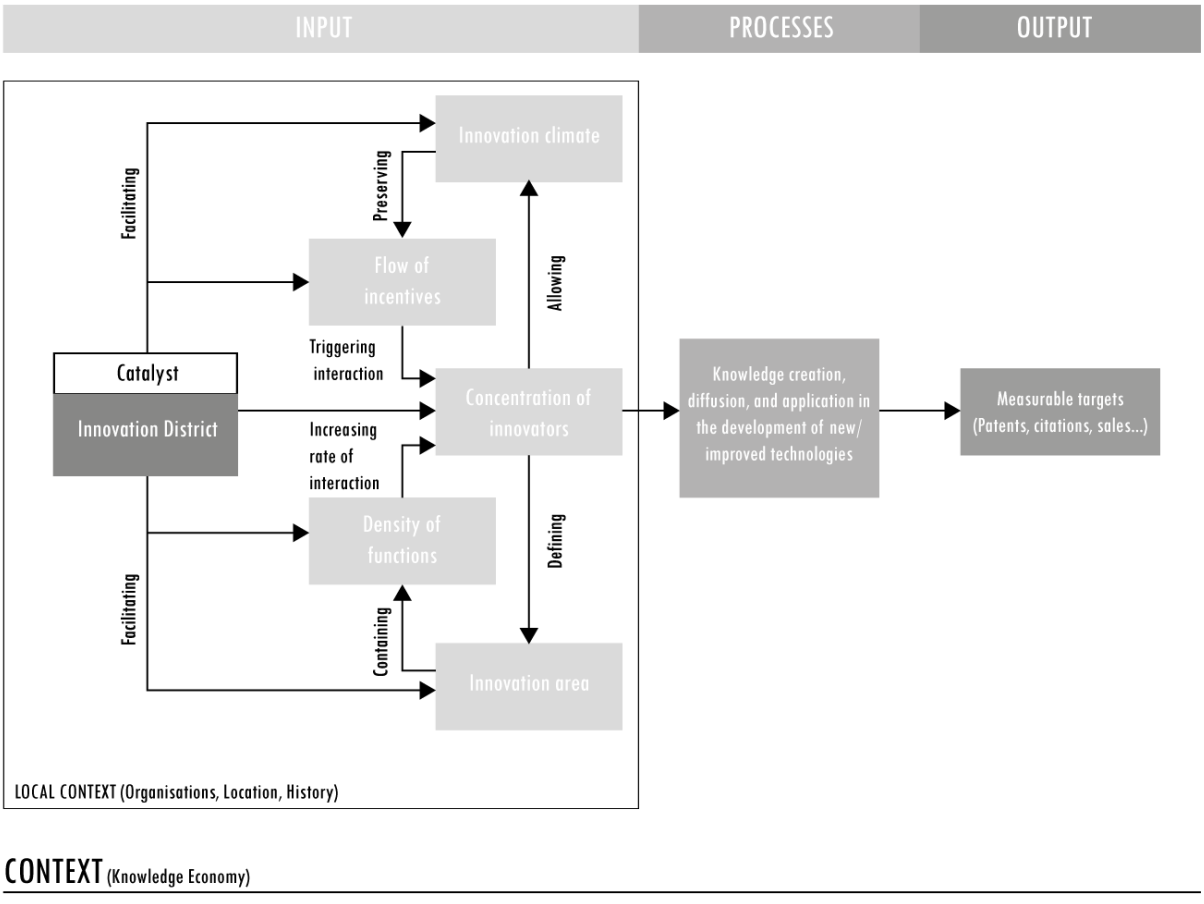


Figure 6. Conceptual framework (Based on Curvelo Magdaniel, 2016)

5.1.4 The Central Innovation District The Hague

The area studied in this chapter is the Central Innovation District in The Hague (figure 7). This district does not have any physical boundaries, but can be regarded as the area between The Hague's three main train stations: Central Station, Hollands Spoor and Laan van NOI. In 2016, the city of The Hague presented its vision for the future with the 'Agenda Ruimte voor de Stad' (Agenda Space for the City). The Hague is expecting a significant growth of 90.000 extra inhabitants by 2040. However, room for expansion is scarce. The Hague therefore mainly focuses on the transformation of existing urban structures to facilitate this growth. What stands out from The Hague's agenda for the future, is that almost half of the new dwellings are planned to be created in the CID. The Hague appears to be evolving into a highly urban environment, with a high concentration of knowledge- and service type businesses. The combination of education, research, government institutions, living and interaction is what provides an opportunity of significant growth for the CID.

Figure 7. The Central Innovation District in The Hague

In setting up its own 'Innovation District', The Hague is following the example of other cities worldwide. Boston, Barcelona and London are just a few examples of cities where a particular area has been assigned for the stimulation of innovation. But how has the CID come to where it is now and why has this particular location been chosen? The following sections will further elaborate on this and give an insight into the creation of the CID.

The CID consists of three different urban environments that are interconnected by the three railway stations. These three areas can be regarded as the inner city, the Beatrix quarter and the Binckhorst/Laakhaven area.

The Inner City

The inner city is a mixed area with over 32 million visitors on a yearly basis (BVR & Tordoir, 2016). The area has many opportunities for shopping and leisure as well as historical sights and cultural amenities. Furthermore, the area has a large supply of office space, is home to several institutions of the national government, has a growing presence of higher education and offers a variety of (highly) urban living

environments. In terms of scale and character, the inner city can mostly be regarded as a historical area. However, some parts can be regarded as highly urban environments, including the Grote Marktstraat and the Turfmarktroute.

The Beatrix quarter
The Beatrix quarter is a business area and is regarded as the second best valued office location of the Netherlands (BVR & Tordoir, 2016). It is home to The Hague's World Trade Center and many international firms are located here. Moreover, it is the location for the The Hague Security Delta, The Hague's rapidly growing security cluster.

Binckhorst/Laakhaven
This area can be regarded as the area that is closely linked to station Hollands Spoor. It is home to an education cluster, with over 25.000 students. Binckhorst is a former industrial area, which houses many start-ups and creative industries. The addition of dwellings into this area is projected to turn this part of the city into a mixed urban district characterized by its high level of creativity.

5.1.5 The city of The Hague

The city of The Hague is located in the Netherlands, in the province of Zuid-Holland. It currently has a population of over 500.000 people and is the third largest city of the Netherlands. The Hague is home to many (inter)national governmental institutions and is currently promoted as 'The International City of Peace and Justice'.

In 1806, during the French Period, a first official Dutch Capital was announced. Napoleon Bonaparte enthroned his brother Louis Napoleon in what was formerly known as the Dutch republic, who then made Amsterdam the capital of his empire. When the French left in 1813, the Dutch returned the seat of government to The Hague. However, the capital city status was not changed as it was not considered to be of significant importance at that time. Furthermore, the city of The Hague never obtained official city rights and is therefore being referred to as the 'largest village in the Netherlands' (Meijers et al., 2014).

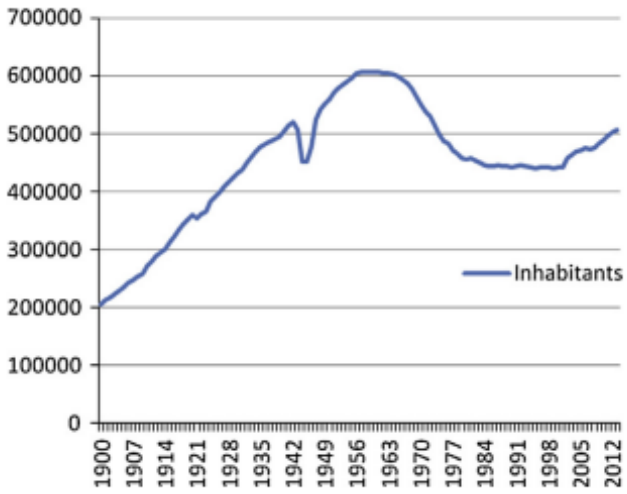


Figure 8. Number of inhabitants in The Hague between 1900 and 2013

Looking at the number of inhabitants in The Hague over the course of the last century, several trends can be identified. Firstly, the Second World War has caused for a disruption of the growing amount of inhabitants, even leading to a strong decrease for a (relatively) short period of time. The second period of shrinkage can be seen in the period between 1960 and 1985. This shrinkage was the result of the 'new town policy', introduced by the national government in 1970, which aimed to concentrate new housing development in a number of greenfield locations in the proximity of existing cities. During the 1970s and 1980s, several ministries and governmental agencies also started moving to adjacent municipalities and peripheral regions in the country. A change in policy can be recognized around the mid-1980s. In order to increase the international competitive position of the Netherlands, it was deemed necessary to strengthen its cities, in particular those in the Randstad (Meijers et al., 2014). In this period, compact city policies were introduced in order to enhance the support base for urban functions, as well as to prevent the increasing urban sprawl and the related growth of mobility. Many

housing areas were developed in neighbouring municipalities that were later annexed by the municipality of The Hague. These developments led to a rise of the number of inhabitants from 1999 onwards. Not only did people start to move towards the city, the ministries that moved out of The Hague in the 1970s, as well as some agencies also returned.

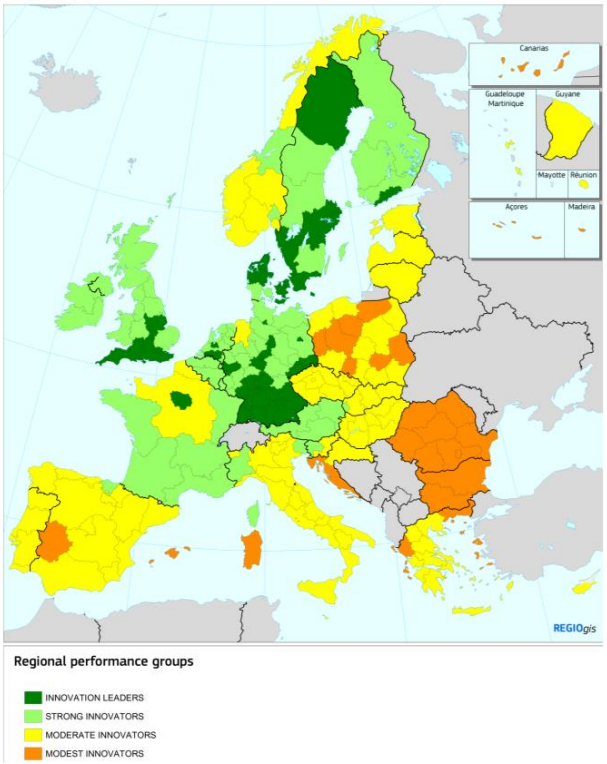


Figure 9. Innovation in Europe (European Commission, 2016)

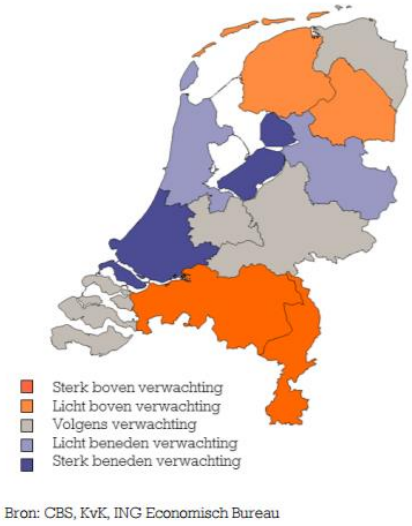


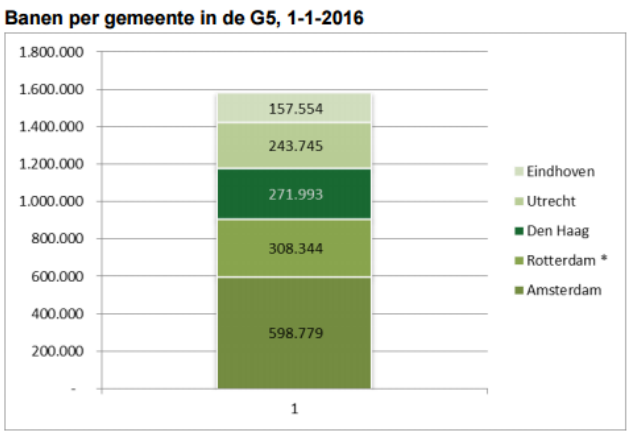
Figure 10. Translation of innovation potential into results in NL (orange: above expectations; blue: below expectations) (ING Economisch Bureau 2014)

In the province of Zuid-Holland, several sectors in the industrial-logistic and knowledge-service sector seem to lack the option of significant growth in their current environment and the flexibility they need in order to be able to innovate is limited (Provincie Zuid-Holland, 2012). Furthermore, the economic agenda of the European Union focuses on the globally shifting economic power-relations, which further emphasizes the need for innovation in order to achieve prosperity and employment and the role of urban regions (MRDH, 2014). It appears that in the province of Zuid-Holland, there is an overrepresentation of mature business sectors and a relative shortage in new, innovative sectors (Provincie Zuid-Holland, 2012). Relating this to the spatial-economic policy trends in Europe ("smart specialization" strategies) and the Netherlands (top sector policy), this means that in order for agglomeration benefits to be able to take place, the regional economy of Zuid-Holland should evolve more into one that focuses on innovative and growing sectors (Provincie Zuid-Holland, 2012). Looking at the division of innovation in Europe (figure 9), the regions of Noord-Brabant and Amsterdam currently take the lead in the Netherlands. In relation to its potential, the province of Zuid-Holland is underperforming (see figure 10). In an attempt to increase its competitiveness, Zuid-Holland is attempting to focus more on the 'knowledge economy', which can be defined as the use of knowledge in interactive relationships between market- and other parties in producing and using goods and services, from the first idea to the use of the end products (Oort & Lambooy, 2014).

The Hague and the G5

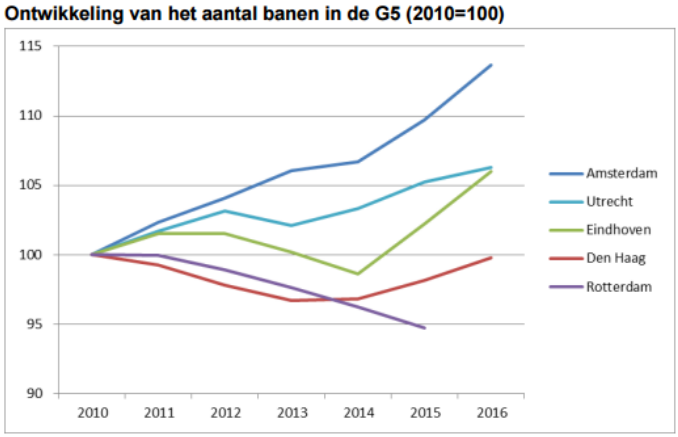
The five main cities of the Netherlands together comprise the 'G5'. The G5 consists of Amsterdam, Rotterdam, The Hague, Eindhoven and Utrecht. Comparing the total amount of jobs in the different municipalities that comprise the G5, The Hague appears to be playing a significant role in the Dutch Economy. Although Amsterdam provides the majority of jobs in the Netherlands (598.779), The Hague provides nearly 300.000 jobs (Gemeente Den Haag, 2017).

When it comes to the growth of the amount of jobs over the recent years, Amsterdam is in the lead (figure 12). The financial crisis of 2008 appears to have caused a disruption in the growth of jobs in all cities in the G5, although Amsterdam does not appear to have been affected much. Since 2013, The Hague has been growing its amount of jobs, to the point where they reached the same level in 2016 as they did in 2010. Compared to Amsterdam, Utrecht and Eindhoven however, The Hague has not reached the same amount of growth.



Bron: Werkgelegenheidsregister Haaglanden, opgave gemeenten, bewerking PSO
* De gegevens van Rotterdam hebben betrekking op 1-1-2015

Figure 11. Jobs per municipality in the Netherlands



Bron: Werkgelegenheidsregister Haaglanden, opgave gemeenten, bewerking PSO

Figure 12. Development of amount of jobs in the five main Dutch cities

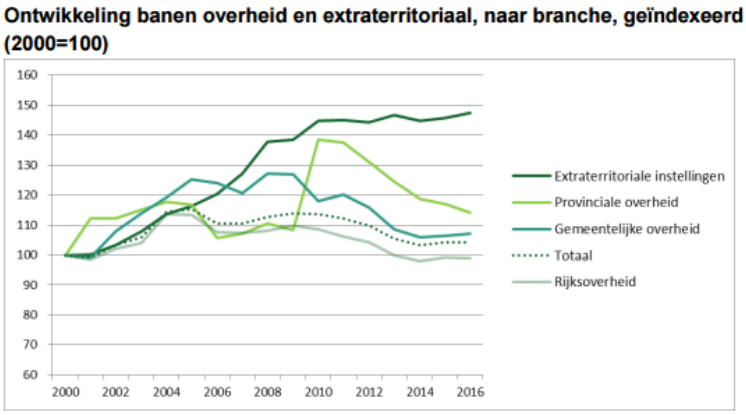


Figure 13. Development of amount of jobs in The Hague in the governmental and extraterritorial sector.

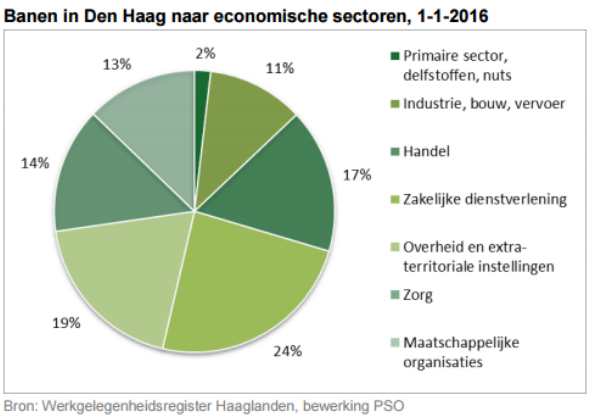


Figure 14. Jobs per economic sector in The Hague.

In the Netherlands, The Hague is well-known for its vast amount of governmental institutions. Figure 14 provides an overview of the different economic sectors in The Hague and the percentage of jobs they produce for The Hague. Although the sector business services is leading in The Hague, providing 24 percent of the amount of jobs, the governmental and extra-territorial institutions amount to 19 percent, which makes it one of the key providers of jobs in The Hague. However, figure 13 shows that the amount of jobs in the governmental sector has been slowly decreasing over the recent years. Although the amount of jobs in the extraterritorial sector has been increasing, all other governmental sector have been decreasing, which underlines the transition that The Hague is going through at the moment.

Security Cluster

The security cluster is increasingly becoming an important sector for The Hague. In 2016, this cluster provided around 15.000 jobs for The Hague (Gemeente Den Haag, 2017). This cluster also appears to be growing each year and added 400 jobs between 2015 and 2016. In the metropolitan region of The Hague, the security cluster has an annual turnover of 2.3 billion euros, which is a growth of 6.7% compared to 2014. 84% of this turnover comes from non-traditional subsectors within the cluster (e.g. cybersecurity). These sectors also show the strongest growth: 7.4% compared to 2014. With a growth percentage of 12% between 2015 and 2016, cybersecurity is by far the fastest growing subsector. This is in part due to the strongly increasing amount of cybersecurity start- and scale-ups in The Hague (Gemeente Den Haag, 2017). The Hague Security Delta, located next to train station Laan van NOI plays a significant part in this growth. It is a network for firms operating in the security sector, which also offers physical office space for both starting firms and larger, international firms.

5.2 Conditions stimulating Innovation in CID and The Hague

This section analyses the case by using the conceptual model as explained in chapter 5.1.3. In doing so, it analyses the case by looking at five different input indicators:

(1) Concentration of innovators
(2) Innovation area
(3) Density of functions
(4) Flow of incentives
(5) Innovation Climate

Each input indicator will be analysed in a different section.

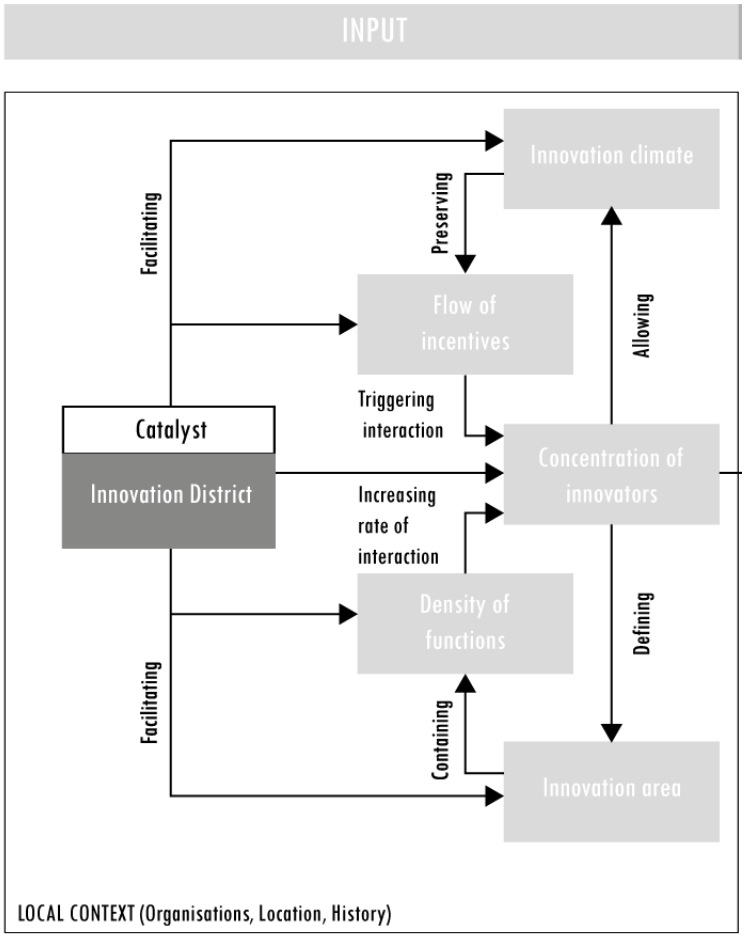


Figure 15. Conceptual framework (based on Curvelo Magdaniel, 2016)

5.2.1 Concentration of Innovators

The first indicator analyses the different entities that are regarded as sources of innovation in the district. These entities can be broken down into several groups. Firstly, there are the educational (universities and higher education) and knowledge institutions. Secondly, a number of large (international) firms can be recognized within the district. Thirdly, the district houses a significant amount of SMEs and start-ups. Fourthly, several governmental institutions are located in the district. These groups will be analysed individually below. A full list of the institutions and firms is provided in the appendix. The section below will elaborate on the most important innovative entities located in the district.

The CID, located in close proximity to the city centre, is home to different sources of innovation. Figure 16 provides an overview of the area that comprises the CID and the different innovative entities that are located there. It makes a distinction between five categories: Educational/Knowledge Institutions; Multinationals; Government; Peace, Justice & Security and Start-ups/Scale-ups/Incubators. The following section will further explain these different categories as well as how they play a role in the CID.

Figure 16. Overview of different economic sectors in the Central Innovation District

Educational/knowledge institutions

Although The Hague does not have its own university, it does serve as a host for the University of Leiden. At the Leiden University Campus, several faculties are located that mostly focus on governance, international law and politics. Recently (February 2017), the Leiden University has opened its new location (Wijnhaven) at the Turfmarkt in The Hague. The opening of this new faculty building underlines the growing state in which the Leiden University currently is in.

Apart from the Leiden University campus, there are several other Higher Education Institutions located in the CID area. The area around the Hollands Spoor station is home to the Haagse Hogeschool and the

ROC Mondriaan. The Haagse Hogeschool, an educational institution for applied sciences, has its own campus here and offers a wide variety of educational programmes. ROC Mondriaan offers several tracks for secondary vocational education. InHolland, another university of applied sciences is located in relative proximity of the Central Station. Moreover, the Delft University of Technology has recently moved its master track Engineering and Policy Analysis to The Hague.

Located more closely to the Central Station, on the other side of the railway tracks, is the Royal Academy of Arts. This institution offers a variety of programmes, including bachelor courses, master courses and postgraduate courses. It focuses on creative courses and includes bachelor courses for Photography and Graphic Design. Another educational institution in the CID area is the Royal Conservatory. It is located on the other side of the Central Station and offers a wide selection of courses related to music.

Not only is the CID home to educational institutions, it also houses several knowledge institutions. A well-known example of this is TNO (Dutch organization for applied scientific research). Other examples of knowledge institutions in the district include Platform 31, ICTU and NWO.

(Cyber)Security
The firms and institutions that deal with (cyber)security can mostly be found near train station Laan van NOI. Here, the The Hague Security Delta (HSD) is located, which is home to a significant amount of both small and large firms that operate in the security sector. Moreover, they have a physical presence in the World Trade Centre building located in close proximity. Examples of firms located here that operate in this sector are Thales, Tracks Inspector and Tymlez.

Peace/Justice
The institutions that can be considered to operate in the Peace/Justice sector are mostly located in proximity of Central Station. Here, several international institutions like UNICEF and the CICC can be found, as well as relatively smaller institutions like the The Hague Institute for Innovation of Law. On the south-western side of the Central Station, the Humanity Hub is located. This hub is the physical location of Humanity-X, a multidisciplinary support team for pioneers in the peace and justice sector who attempts to leverage digital innovations to help overcome global issues. Eurojust is also located in proximity of the district, but is planning to move to the north-western part of The Hague. Closer to station Laan van NOI, the European & Developing Countries Clinical Trials Partnership (EDCTP) can be found.

IT/Telecom
The firms operating in the IT/Telecom sector are spread throughout the district. Next to the building where the HSD is located, SIEMENS and AT&T have an office. In the south-eastern part of the area, KPN has located its headquarters. T-Mobile also has a presence in the district, next to train station Hollands Spoor. The Hague Tech is located on the east side of the Central Station, which is a network for firms operating in the tech industry that wish to connect to peer-firms and large firms and need a physical office.

Governance
The district houses several governmental institutions, which are all located close to the Central Station. Here, the municipality of The Hague is located, as well as national institutions like the national parliament. Moreover, a number of ministries can be found here, among which the ministry of Foreign Affairs, Finance, Economic Affairs, Interior and Kingdom Relations, Defence, Education, Culture & Science and Infrastructure & Environment. The building of the Dutch parliament is currently undergoing a renovation, which means it will temporarily have to move. Therefore, the parliament will move to the building of the ministry of Foreign Affairs for the duration of the renovation.

Mixed entrepreneurship (SMEs & start-ups)
The district contains several buildings that house a significant number of SMEs and start-ups. The New World Campus, located in close proximity of the train station Hollands Spoor, is an example of this. It is home to several firms and start-ups that have the common characteristic that they aim to improve the world by fixing global issues. In the Binckhorst, more of such buildings can be recognized. A well-known example is Bink36, located in the north of the district, but also the Caballero Fabriek and Mooof house a great number of small firms.

5.2.2 Innovation area
This indicator analyses the geographical aspects of the district. It attempts to reveal how the physical characteristics of the district allow contacts between innovators located in the district. Therefore, an important aspect of this indicator is the level of scale and connectivity in the district. Firstly, however, this section will elaborate on the change of the vision towards the district and the role of the knowledge economy in this.

As has been elaborated on in the previous section, the district houses many governmental institutions. Moreover, throughout history (see section 5.1) The Hague has been known as the international city of peace and justice, automatically connecting it to governance. Considering the economic change the world has seen in recent years, however, The Hague attempts to intensify its share of the knowledge economy. The CID has been put forward as the main location for this and should therefore serve the growth of the knowledge economy. The following will elaborate on several physical aspects of the district that characterize the area and are of influence on its position in the metropolitan and (inter)national network.

A noteworthy aspect of the district is the presence of the three railway stations. Each of these stations as well as the tracks are located above ground and strongly divide the area into different parts. The Central Station connects The Hague with Utrecht, while Hollands Spoor and Laan van NOI provide connections with Leiden, Amsterdam, Delft and Rotterdam. On an international level, the Schiphol airport (Amsterdam) and the Rotterdam – The Hague airport contribute to the connection of The Hague and the CID to Europe and the rest of the world.

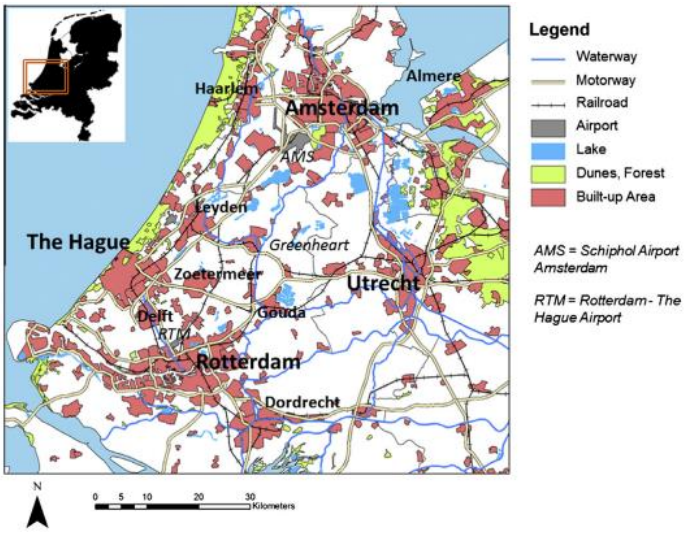


Figure 17. The Hague's position in the Netherlands

Figure 18. The metro-line in the Beatrixkwartier

Another important aspect of the infrastructure in the area is the metro that connects the Beatrixkwartier with the Central Station and the centre of The Hague. The metro-line is elevated, which allows traffic to pass underneath. The opening of the metro in 2006 has significantly contributed to the accessibility of the area and has played a large role in the level of attractiveness of the Beatrixkwartier.

Figure 19. The Turfmarkt

The Turfmarkt, located next to Central Station, is one of the streets in the CID where a mix of functions has been one the main goals in the design process of the area. The Ministry of Security and Justice and the Ministry of Home Affairs are located in this street, as well as the new faculty building of the University of Leiden (Wijnhaven). Moreover, it offers a variety of cafés and food-related services, as well as a large amount of dwellings on the higher floors of the buildings.

5.2.3 Density of Functions

This indicator is used to analyse the diversity/mix of activities in the innovation district, which increases the opportunity of interaction between innovators. Because knowledge sharing and idea generation have a strong relationship with social interaction and trust between innovators, this indicator has a social component.

The city of The Hague has a population of approximately 520.000 people. It is projected that this amount will grow by 5000 people each year (Gemeente Den Haag, 2016). To be able to facilitate this growth, the municipality of The Hague plans on adding 50.000 dwellings until the year 2040; 18.500 of which are projected within the confines of the CID. Despite the cluster of high-rise buildings around the Central Station, the CID currently has a relatively low amount of dwellings. By adding more dwellings in the CID, the municipality aims to create a lively environment and provide space for people with an 'urban' lifestyle. The current trend among high-educated thirty-year-olds seems to be to move out of the city. In an attempt to change this trend, the municipality of The Hague increasingly invests in creating a vibrant urban environment that will attract and maintain this group.

The amount of students in the University of Leiden is projected to grow with 10.000-15.000 students in the coming 10 years. Moreover, the movement of the TU Delft master track Engineering and Policy Analysis to The Hague will further increase the amount of students in the city.

Because of its size and the large amount of railways dividing the area, the CID district has a number of different types of environment. The shops in the city are mostly located in the centre of the city. This is also where the highest mixture of functions can be recognized, as the area houses a great number of retail, cafés, restaurants, dwellings and more. The area next to station Hollands Spoor is also home to a significant amount of shops, although these are mostly concentrated in a shopping mall. It can be concluded that a mixture of activities and uses in the CID can mainly be found in the areas that are located close to the city centre. A mixture of dwellings and amenities is less present in the southern and eastern part of the CID. In the southern part, the Binckhorst area, mostly industrial uses can be recognized. However, several buildings have been transformed into spaces for small firms, which indicate the first signs of a transformation of the area. The eastern part of the district can be categorized as a central business district; high, modern office buildings with a low mixture of dwellings, retail and hospitality services.

For The Hague, being a lively and attractive city is important for its future growth. However, the strong division of the district into different sub-areas that show differing types of environment does not help to fulfil this ambition. In The Netherlands, cities like Amsterdam and Rotterdam show considerably higher levels in attractiveness and are currently the main locations for expats to live in. Although the area located next to the city centre shows a mixed environment with a variation of activities, the rest

of the district does not show such a lively environment and provides the city of The Hague with a challenge in the competition with their neighbouring cities.

5.2.4 Flow of Incentives

This indicator refers to the actions needed by the innovators to start and to carry on the processes of knowledge creation, diffusion and its application in the development of technologies (Curvelo Magdaniel, 2016). An important aspect of this indicator is the role of the stakeholders in the Triple Helix. In The Hague, there are a number of programs and events set up by either the municipality, universities or firms to spur innovation in the district.

First of all, the city of The Hague has set up a program under the name Impact-City, which focuses on the impact economy. The Hague considers the impact economy to be an economy with high potential of growth and which creates products that benefit the public. “Impact” therefore refers to the social impact that innovations can have. In order to stimulate this specific economy, The Hague facilitates the organization of events and maps the current firms and institutions that have significant importance for this economy.

Another important institution in The Hague, or rather in the MRDH region, is Innovation Quarter. It is the regional development corporation for the metropolitan region and both advises and financially supports firms that wish to settle in the region. In doing so, it focuses on the following sectors: Cleantech; High tech & smart industry; Safety & Security; Horticulture; Life Sciences & Health; Water & Marine. An example of an event organized by Innovation Quarter is the Start-up Fest (25-26 September 2017), which is an event in which start-ups and businesses can come together and experience new innovations in different economic fields.

The Hague Security Delta (HSD) is an important economic network in The Hague. It as a network for firms operating in the security sector and has been the result of a collaboration between firms and the municipality. Apart from offering office space to both young and adult firms, it offers several facilities to its tenants. Moreover, the extensive variation of partners that form part of the HSD is an attractive network for firms to take part in.

Since 2001, the municipality of The Hague is the owner of an old cigarette-factory in the south of the Binckhorst Area. After taking ownership, the municipality invested in the renovation of the building and completed this in 2009. Upon completion, it was used as a location for office space for small to medium firms. Apart from this building, the municipality has also offered property to NGO’s on the Laan van Meerdervoort and the Zeestraat.

The municipality of The Hague has recently set up a collaboration with the educational institutions Leiden University, The Hague University of Applied Sciences and the Delft University of Technology. A conference was held in the spring of 2017, in which these institutions were invited to think about what the collaboration with the municipality could offer and what it should look like. The main goal of this collaboration is to set up a community of practice and knowledge for the innovation district.

The University of Leiden has its own platform for innovation: Centre4Innovation. This platform assists students that wish to transform their idea into a (start-up) business.

Firms also show attempts at supporting innovation in the district. An example of this is The Hague Tech, a network for (small) firms operating in the tech industry that also offers physical office space in a building near the highway. The provision of this space has been realized in collaboration with MN, a pension and insurance firm located in the district. Another example is the Security Research & Innovation Event (SRIE), organized by the HSD, European Commission and the European Network of

Law Enforcement Technology Services (ENLETS) in June 2017. Moreover, several contests are organized by different actors of the triple helix to spur innovation and find solution for various types of problems. An example of this is the Innovating Justice Challenge, set up by the Hague Institution for Innovation of Law (HiiL), but also the accelerator programme "Start-up in Residence" set up by the municipality of The Hague is an example of where a governmental actor asks the market to come up with solutions for (wicked) problems.

5.2.5 Innovation climate

This indicator refers to the interrelated -social, economic and technological developments in context preserving the flow of incentives or increasing the actions needed for innovators to carry on their processes (Curvelo Magdaniel, 2016).

International city The Hague

Even though The Hague has a relatively small number of half a million inhabitants, it hosts a significant list of European and international organizations. Among these are the International Court of Justice, Europol, Eurojust, as well as the Organisation for the Prohibition of Chemical Weapons (OPCW). The total number of international organizations in The Hague amounts to over 300. These organizations range from intergovernmental organizations to NGOs and embassies and consulates. The Hague is also home to the Dutch royal family, the national government, the House of Representatives and the Supreme Court. Moreover, The Hague hosts the headquarters of several large international firms, including Shell, Siemens and KPN Telecom.

Because of the significant amount of public institutions that are present in the city, The Hague has a distinct economic profile that complements the other major cities of the Randstad metropolitan region, of which it is part (Meijers, 2007). This position in a larger metropolitan urban system brings both advantages and disadvantages (OECD, 2007).

The city of The Hague does not have its own university. Instead, it hosts a branch of the University of Leiden at the 'Campus The Hague', which was founded in 2009. It is a separate faculty and offers a selection of courses related to international peace and justice. In addition to this campus, several research institutes have been set up, including for instance the 'The Hague Academy of International Law'. The Hague is attempting to concentrate these international organizations and supporting facilities in its so-called 'International Zone', which includes the office of the International Court of Justice, Eurojust, Europol and the conference facilities of the World Forum Convention Centre.

Development of the international sector

One of the reasons for the international character of The Hague, is the location of the seat of the government in the Netherlands. Another major reason is that The Hague has been the location of many peace congresses. Starting in the 17th century, interstate (peace) congresses were held after episodes of warfare. The congresses were meant to establish a just peace and to confirm the new status quo of the power distribution within the state system (van der Wusten, 2006). These congresses were usually held in neutral, symbolic places. The Hague became one of those, which brought prosperity to the city. To facilitate these congresses, The Hague made major investments in catering to the needs of the cosmopolitan transnational society that gathered there (Van der Wusten, 2006).

Before the First World War, several international conferences on International Private Law were organized in The Hague. In this period, the idea of permanent institutions where interstate political issues could be discussed gained momentum, ultimately leading to the establishment of the Permanent Court of Arbitration in The Hague after the 1899 peace congress.

One of the reasons for organizing the peace congresses in the Netherlands, was the neutrality of the country and the absence of local security threats to delegates (Meijers et al., 2014). After the Second World War, the Netherlands decided to abandon its neutral position and joined NATO. In 1953, the Netherlands included the following declaration in its constitution: ‘‘the Government shall promote the development of the international legal order’’.

The international sector and governmental policies

In the past, cities were mainly seen as centres of production. Nowadays however, cities are increasingly regarded as centres of consumption (Glaeser et al., 2001; Rappaport, 2008). Particularly higher-educated service-sector workers prefer places with a high amount of consumption amenities. Because of this development, catering to the needs of post-industrial city dwellers has become an important urban growth strategy (Clark et al., 2002).

Furnée (2013) has shown that throughout the 19th Century, The Hague’s city council was convinced that “investment in all sorts of polite urban pleasure – including the seaside resort of Scheveningen, concert associations and beautiful green walks – was the best conceivable policy for the economic prosperity of the city”. This vision included a rich cultural infrastructure, which would make sure that the “corps diplomatique”, the local aristocracy, high civil servants and military officers were able to spend their money more freely. The aim of this strategy was to attract aristocrats and other independent people from provinces and colonies to build up a pleasant life in the city. Moreover, it would persuade tourists to extend their visits. The presence of these groups of people would stimulate local retailing and industry, as well as cause for an increase in the city’s tax income.

A new policy strategy

Although the above clearly shows an effort to develop into a consumer city, it appears that the opportunities for attracting international organizations had not been the aim of acquisition policy at both the local and national government level for a long time (Meijers et al., 2014). Whenever potential candidates presented themselves, the government mostly adopted an ad-hoc approach. This caused for mixed results. In the 1980s, during the economic downturn, the Ministry of Foreign Affairs increasingly started to put emphasis on the economic potential of international organizations. In 1988, this resulted in the development of an interdepartmental coordination structure that was set up to acquire international organizations. However, it was not until 1997 that a permanent structure was set up to replace the ad-hoc approach (Van der Wusten, 2006). In 2005, an ‘ambassador international organizations’ was introduced for the acquisition of, and the relations with, international organizations on behalf of the national government (Meijers et al., 2014). Also in 2005, the ministry set up the interdepartmental steering committee ‘Netherlands Host Country’, in order to better facilitate international organizations and embassies.

Although the involvement of the ministry meant more attention for the acquisition of international organizations, it also meant a limited involvement of the city of The Hague in this regard. However, in the early 1990s, The Hague wanted to become more involved. The city started to improve its conference facilities in order to enhance the international business climate. Moreover, the policy attention towards acquisition increased and led to a strong involvement in the acquisition of the International Criminal Tribunal in 1993, the Organization for the Prohibition of Chemical Weapons (OPCW) in 1997 and the International Court of Justice in 2002. The acquisition of these organizations have contributed to The Hague’s image of a city of peace and justice.

Mixing public and private

In addition to its focus on peace and justice, the city of The Hague has recently started to consider international security as an important sector. The presence of a cluster of judicial organizations has been a strategic asset during the acquisition process of Europol, the International Criminal Court and Eurojust. Not only has the focus on international security resulted in more jobs in the public sector,

the private sector has also appeared to profit from this development. This has resulted in the 'The Hague Security Delta', the brand under which a network of companies, organizations and knowledge institutes in the fields of national, urban and cyber security have been brought together (Meijers et al., 2014). The focus of The Hague on private institutions shows a path of less dependency on the large public (international) organizations. This change in focus in policy has broadened the vision of the city, which now focuses on clusters of companies that already have a strong foothold in The Hague, such as energy, telecom, business services and the security sector.

Besides the international orientation and connectivity of the Netherlands, fiscal considerations are also regarded as one of the main motives for foreign companies to settle in the Netherlands. Moreover, the Planbureau voor de Leefomgeving (PBL, 2011) has concluded that in the Netherlands regional characteristics have a greater influence on the locational choice made by foreign firms than national factors. This study further concluded that The Hague's region (South-Holland) offers a high public R&D intensity, excellent universities (Leiden, Rotterdam, Delft) a large share of high-educated employees and a strong specialization in knowledge-intensive services. However, the study also concluded that private R&D and critical mass to obtain agglomeration benefits were considered to be less available than in competing European regions (PBL, 2011).

The Hague International City

At the moment, The Hague and the national government are using the umbrella term 'The Hague International City' to pursue policies regarding spatial, economic and marketing issues. These policies include the following:

(1) Strengthening the knowledge infrastructure,
(2) Spatially clustering international organizations in an 'International Zone',
(3) Improving the hospitality of the city
(4) Creating and maintaining an attractive living and working environment.

One of the tools for attaining these ambitions of The Hague, has been city marketing. Over the years, The Hague has used different brand names. Where it is now known as the 'International City of Peace and Justice', it was formerly known as the 'World City by the Sea' and 'Legal Capital of the World'. Since the security sector in The Hague is been growing significantly, some argue that the current name should be changed into 'International City of Peace, Justice and Security' (Meijers et al., 2014).

The Hague in transition

In the past, firms preferred to be in The Hague because of the presence of governmental institutions. In that sense, being close to other firms appeared to be of less significance. The current trend of a shrinking public sector will have its consequences for the city of The Hague. Questions arise around the reasons for firms to stay (or come) to The Hague. As has been mentioned by the municipality (Gemeente Den Haag, 2016), the city is currently undergoing a transition. A transition in which the city is reassessing its strengths and weaknesses and aims to take advantage of them. The Central Innovation District is used as one of the propositions to contribute to this transition.

The birth of an innovation district

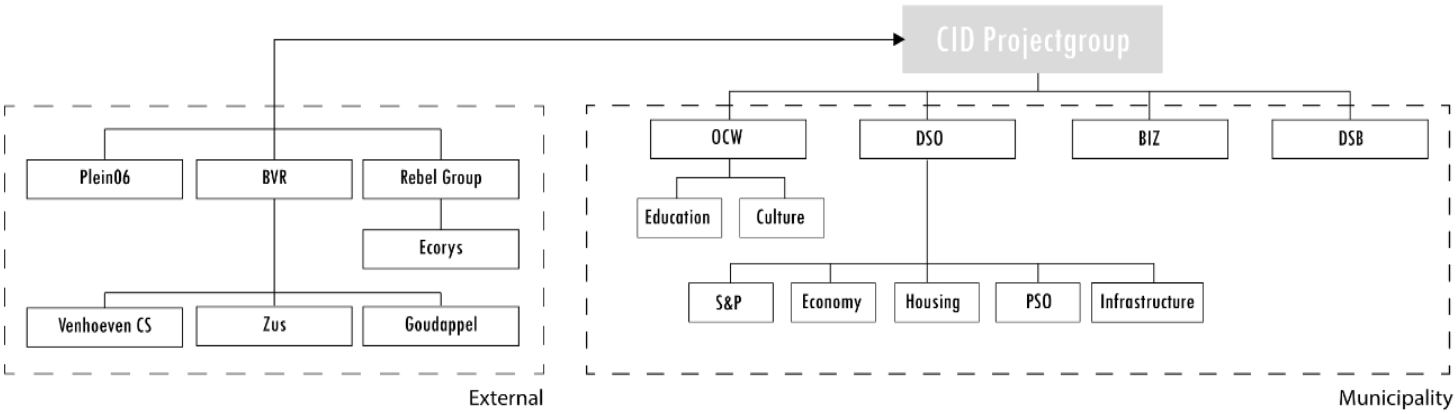
Although the moment in which the idea of creating an innovation district came to be does not appear to be fully clear, an attempt has been made here to trace back the steps. A defining moment in the (brief) history of the Central Innovation District was when the head of the DSO department of the municipality of The Hague (Erik Pasveer) gave a presentation about the city of The Hague, in which he showed a map of the city. This map demonstrated three knowledge campuses around the main train stations that include the University of Leiden, the Haagse Hogeschool and the The Hague Security Delta. The idea of these campuses caught on and was chosen to be presented as a case at the International Architecture Biennale in Rotterdam as the 'Knowledge Triangle'. The comments about the case were mostly positive and encouraged The Hague to continue developing this idea. When Pasveer read the literature about innovation districts, he realized the 'Knowledge Triangle' could potentially become such a district. From that moment on, the district has become known as an 'innovation district'.

5.3 Actor analysis

This section will attempt to provide an insight into the actors in play in the innovation district in The Hague. The result of this is an overview of actors that will be used for further analysis in the following chapters. This will help to analyse which actors are important to interview on the side of the municipality, but will also help to discover what the main actors in the district are on the demand side. This analysis is done by using the framework as described by Koppenjan en Klijn (2004). This analysis makes use of a system in which different steps are used to map the actors involved, as well as their goals, resources and degree of criticalness. This analysis does not aim to make uncertainty disappear. Rather, it aims to provide a better understanding of the actors involved and the differing ways in which they are involved. It is important to mention here that this analysis is performed at a specific moment in time. It will therefore be necessary to frequently conduct as well as adapt this analysis in order for it to be able to open up to opportunities for changing insights, new developments and changing compositions of actors.

CID project group

The 'CID Project group' is a group that has been set up by the municipality of The Hague and specifically focuses on the development of the Central Innovation District (figure 20). It consists of several different departments of the municipality. It includes the department of Education, Culture and Welfare (OCW), the department of International Affairs (BIZ) and the department of Urban Development (DSO). Within these departments, several sub-departments are involved in the development of the CID. In the department of OCW, these include the department of 'Education' and 'Culture'. In the department of DSO, five sub-departments are involved, namely 'Urban Design & Planning' (S&P), 'Economy', 'Housing', 'Program management, Strategy and Research' (PSO) and 'Infrastructure'. Although the project group operates as a single entity when it comes to discussing the future of the district, they remain different departments. Contact with the different groups of stakeholders (see next section) is therefore handled by different departments, from different (physical) office spaces.



OCW: Onderwijs, Cultuur en Welzijn
DSO: Dienst Stedelijke Ontwikkeling
BIZ: Bureau Internationale Zaken
S&P: Stedenbouw & Planologie
PSO: Programma Management, Strategie en Onderzoek
DSB: Dienst Stadsbeheer

Figure 20. Overview of departments and external actors involved in the CID

Problem statement

Considering the strong ambition of the municipality of The Hague for an innovation district, this analysis approaches the CID from the perspective of the municipality. In order to be able to map the actors involved, a problem statement will be used. This problem statement helps to map which actors are involved in the district as well as to unveil their view on the problem. As a result of an analysis of documents as well as several interviews and conferences, the following problem statement has been constructed:

"The CID needs to become an internationally competing innovation district, stimulating collaboration between all layers of business and society. The current situation appears to be coming short on many different aspects that successful innovation districts do have. Furthermore, the barriers in the district pose a serious problem in terms of connection between the different sub-areas. These barriers also make it difficult to create a centre in the district. The physical centre of the district currently mostly houses dwellings, while the surrounding areas house offices and other functions. In order for the CID to ultimately be able to become a successful innovation district, changes will have to be made in the physical, institutional and economic environment of the CID."

In short, this problem statement can be summarized as "The CID is not an innovation district yet". This problem statement has been used to map the most important actors in the district by using the framework provided by Koppenjan and Klijn (2004). Table 4 provides an overview of the most important types of actors that have been identified as a result of this, as well as an overview of the specific actors that have been used in this research. A complete overview of the actors that have been identified can be found in the appendix (figure A1 & A2).

Steer	Demand					
Public	**Universities**	**Firms**	**(Start-up) clusters**	**Knowledge Institutions**	**Ministries**	**NGOs**
Municipality The Hague	Leiden Universiteit	T-Mobile	Bink 36	TNO	Foreign Affairs	CICC
	Haagse Hogeschool	Siemens Nederland B.V.	Caballero fabriek	Platform 31	Home Affairs	The Hague Institute for the internationalization of Law (HiiL)
	ROC Mondriaan	Thales	HSD	DANS		Vewin
	Royal Academy of Arts	AT&T	New World Campus	Rathenau Instituut		IWA
	Royal Conservatory	Nationale Nederlanden				
		Tracks Inspector				
		Jacobs Nederland				
		EDCTP				

Table 4. Overview of (groups of) actors used in this research in the Central Innovation District The Hague

Now that the different groups of actors both within and outside the municipality have been identified, these actors will now be used to discover the ambitions from the supply side, as well as the important factors for the demand side. Chapter 4 has elaborated on the way these actor groups have been approached. Chapter 6, 7 and 8 will further elaborate on the results of the interaction with these actors.

5.4 Conclusion

This chapter has attempted to answer several questions, as introduced in the beginning of this chapter. The following will elaborate on the answers to each of the questions.

How has the CID developed? Why has the city of The Hague chosen this location to realize an innovation district?

The main reason for the creation of the Central Innovation District appears to be the presence of three "campuses" in the district located around the city's three main train stations: Central Station, Laan van NOI and Hollands Spoor. The presence of these campuses has been linked to the theory about the 'triple helix' and innovation districts and hereafter the Central Innovation District was formed.

Who are the actors involved in the development of the CID?

A variety of actors are involved in the Central Innovation District in The Hague. From the side of the municipality, several departments are working on the district. What is more, the municipality has hired

a number of private organisations to assist in the development of the district. From the demand side, there also appears to be a variety of actors involved. These actors vary from universities to (start-up) clusters and each have their own roles and resources (see appendix).

What physical interventions have been done in the district to stimulate innovation?

Since the Central Innovation District has fairly recently been announced, no particular physical interventions have yet been recognized that have specifically been made to stimulate innovation. However, the ambitions for the district show that the municipality has several interventions in mind. These interventions mostly revolve around the addition of housing, the mixture of uses and investment in infrastructure and public space. Chapter 6 will further elaborate on these ambitions and the corresponding policies of the municipality.

6. Ambitions and policies

6.1 Introduction

This chapter aims to answer the following research questions:

6. To what extent are the ambitions of The Hague based on the theory from sub-questions 1, 2, 3, 4 and 5?
7. What types of innovative entities is the CID targeted at?
8. What are the goals and policies of actors operating on the steering side regarding the district?

Interviews have been performed with multiple actors within the municipality as well as external parties, in order to come to an understanding of the different topics regarding the case and to be able to answer the research questions here above. Table 5 provides an overview of the interviews that have been conducted with the different departments of the municipality.

Interviewee	Role
Municipality of The Hague	
Kees de Leeuw	Infrastructure
Martin Paasman	Urban Design / Binckhorst
Marcel van der Klaauw	Education
Daan Rijnders	Economy/HSD
Eit Hasker	Urban Design / CID
Marcel de Rouw	Housing
Enno Ebels	PSO
Erik Pasveer	Head of DSO department
Anne-Marie Hitipeuw	International

Table 5. Overview of conducted interviews

6.2 Results

Each interviewee has been interviewed by using a combination of consistent questions (the same for every participant) and differing questions, depending on the role of the actor (please refer to appendix for an interview protocol). The results of the interviews will be explained in the following sections.

6.2.1 Ambitions

The municipality of The Hague has high ambitions with the development of the CID into an innovation district. The following section provides an insight into the municipality's ambitions regarding the district.

Infrastructure

The municipality of The Hague has set high ambitions regarding the infrastructure in the area. One of its goals is to decrease the use of cars and create a better division of use between the different modes of transport in the area. This also means that the amount of parking in the streets is to be decreased. Moreover, the municipality aims for an optimal accessibility with good connections through public transport and bike connections to connect the area to its surroundings. Walkability is also considered to be an important factor for the success of the area. The idea here is that the area should be accessible on a large scale and walkable on a small scale. To achieve this, the municipality aims to activate pedestrian routes in order to generate activity and further improve the connections on a larger scale. All of these ambitions relating to infrastructure go hand in hand with the municipality's goal of becoming more sustainable. Electric cars, a higher amount of people on bikes and better walkability all contribute to the sustainability of the area.

Another important infrastructural issue in the geographical area of the CID is the large amount of railway tracks that run through the district. Because of the central location of these tracks, barriers are formed that make it difficult to connect sub-areas with one another. One of the ambitions of the municipality is to break through these barriers and connect the areas with paths for pedestrians and bike lanes. The municipality does not consider the CID to be a closed off area, but rather aims to connect the district to its surroundings.

Functions & Amenities

The main ambition in this category appears to be a higher mix of functions in the area. In its current state, the CID area has a strong division of sub-areas, which have differing amounts of functions and amenities. The area close to the city centre, for example, has a strong mix of functions, while the Beatrixkwartier is characterized by office space. The ambition here is to create an environment which resonates the characteristics of a highly urban centre. Silicon Valley, as innovative as it may be, can hardly be characterized as an urban centre. Instead, The Hague is looking for a 'Silicon Alley', New York's version of San Francisco's famous innovative district. The municipality aims to create an environment in which young (entrepreneurial) people would like to work and reside. The functions and amenities in such an environment play an important role and coincide with the municipality's ambition of becoming a cultural hotspot.

One of the uses to be added to the district is housing. In its current state, the area possesses few housing and has many areas that show a high level of mono-functionality. This is not preferred by the municipality. Instead, the city of The Hague would prefer to see a higher density in the district with a high mix of different uses. In order to achieve this, they set out to assign strategic places where the innovative programme can be enhanced and different types of uses can grow. Moreover, the municipality is looking for new concepts of housing that correlate with the CID-vision.

Apart from the mixture of different uses, the municipality has the ambition of creating a climate that supports the development of start-ups. This will be further elaborated on later in this chapter. Furthermore, The Hague is open to new initiatives regarding events related to innovation.

Design

This category relates to the design of the public space and the vision the municipality has regarding the design of the buildings in the district. The municipality's ambition is to create a district in which buildings connect with their environment. To achieve this, the department of urbanism has set up rules for specific areas regarding certain design principles. For example, the municipality would like to see entrances connect with main (pedestrian) routes and the plinths of buildings should have a high level of transparency. This has much to do with the idea of 'open innovation' that coincides with innovation districts. The municipality also wants the public space to reflect this, and should therefore be an inviting place that motivates people to meet one another. Moreover, to be able to facilitate different types of uses within the district, spaces within buildings should have a certain level of flexibility.

Image

The municipality aims to create a brand for its innovation district that creates commitment and publicity. As has been explicitly mentioned, the municipality is still searching for the identity of the CID. This means that at the moment, there is no clear message about the strengths of the district. In the future, The Hague would like to have a clearer perception about the (inter)nationally distinguishing aspects of the district. By collaborating with knowledge institutions and firms, the municipality aims to create commitment amongst the different actors in the district. Currently, the district is called "Central Innovation District", but the municipality is considering renaming it in the future into a name that better suits the district. One of the ambitions mentioned by the municipality is to further strengthen the cluster of firms and institutions operating in the cluster of peace, justice, security and governance. However, a clear overview of the firms and institutions operating in this sector appears to be missing and a clear strategy to achieve this has not yet been formulated. Considering the importance of the image of the district, the ambition here is to make sure that image is clear and that the innovative power of the district is explicitly demonstrated.

Other ambitions

Apart from the categories distinguished in this research, the municipality has several other ambitions in relation to the district. An important subject is the matter of inclusiveness. The Hague is characterized by strong distinctions within its population. The colours of the flag of the city (yellow and green) are said to be a representation of the city's division between peat and sand. To this day, a demographic division can be recognized on a number of different categories (e.g. income level, level of education). The municipality aims to break with this tradition by creating a district with a high level of inclusiveness.

One of the reasons of the creation of the CID is the need for jobs in The Hague. The city of The Hague aims to re-invent its economy and create a place where knowledge workers can work and reside. One of the interviewees mentions that The Hague used to be a 'corporate facilitator' and now has the ambition of spurring a flow of buzz that challenges the corporate systems. The municipality has its eye on the group of new, young businesses, or, 'start-ups' in The Hague to fulfil this role. To facilitate this group, cheap and flexible space is needed. Currently, most of this space can be found in the Binckhorst area. The municipality's ambition is to connect the CID with the northernmost part of the Binckhorst and give start-ups a presence in the innovation district.

As explained in chapter 5, The Hague has not been known as a university-city throughout history. With the presence and continuing growth of the Leiden University, however, The Hague aims to further strengthen its image as an attractive city for students to study and live in. This, of course, has much to

do with the functions and amenities the city provides. Chapter 7 will further elaborate on the current state of the district in relation to the needs of students.

Finally, the municipality would like the district to be an example of sustainability. The specifics of this are yet to be defined and the possibilities are currently being evaluated.

6.2.2 Policy

This section discusses how the ambitions of section 6.2.1 will be attempted to be realized by the municipality of The Hague and which tools they use in this process. As this research focuses on the categories as introduced in chapter 4.2.4, the following sections will elaborate on these categories. Therefore, the ambitions as discussed in the category 'other' will not be elaborated on here.

Infrastructure

Being that infrastructure is mostly a matter of governmental interventions, the city of The Hague can considerably influence this aspect of the district. Its ambition of high levels of accessibility, walkability, bike-ability, etcetera, can be fulfilled by further improving the already existing public transport hubs and the design of public space. The ambition of less parking in the streets is attempted to be fulfilled by negotiating with developers about the amount of parking places within buildings and the possibility of providing shared vehicles. However, the municipality is dependent here on developers for the provision of such services.

One of the projects currently under development, is the creation of a higher level of scale of the public transport infrastructure (MRDH, 2017). This project is being executed on the level of the metropolitan region and will further increase the connectivity between the cities in the region. This will also add to the level of accessibility of the innovation district.

Functions & Amenities

This category can be regarded as a difficult category to influence for the municipality. Since it is not the city of The Hague who will run the businesses and activities that create the 'buzz' that is so sought after, they are left with a more secondary role. However, the city can impose a great deal of influence in this category by setting up rules for development and creating zoning plans for the area. Allowing for a variety of uses or setting up rules regarding the preferred percentages of use on selected plots provides the municipality with the power of influencing the outcome of development in the area. Currently, this is done by forming 'package deals' with developers about, for example, the preferred type of housing the municipality wishes to see in a particular area.

Design

This category, like the former category, has much to do with the rules the municipality sets up for the area. However, a distinction can be made here between public- and private space. Since the municipality is usually the owner of public space, the level of influence here is high. The city can decide what the public space will look like and create a design which they see fit to support the area. The private space, however, is a different story. Here, the municipality can merely influence from the side-lines and more or less act as a referee. Zoning plans, in combination with rules for heights of buildings (and floor levels) and the level of transparency of facades are the tools currently used to influence this aspect of the environment.

Image

The image of the district has much to do with how the municipality decides to portray the innovation district to the outside world. As the district is still under development, this image or 'brand' is not yet clear. However, when the municipality has a better perception regarding this image, they can use

marketing techniques to influence this aspect of the district. Chapter 2.1.4. has explained the ways in which such a brand can be formed and used with regard to innovation districts.

6.2.3 Ambitions & policies versus theory

This section goes into depth about the link between the policy/strategy of the municipality and the theoretical concepts discussed in literature regarding innovation districts, as explained in chapter 2. It evaluates whether the strategies and policies formed and used by the city of The Hague correspond with the theories as described in literature. Considering these concepts, it can be concluded that several of these theories are being used, while others do not appear to be as clearly present in the current line of thought of the municipality. The following section will further elaborate on this.

Strong connection with theory

An important reason for the existence of The Hague's innovation district, is the city's necessity to re-invent its economic system. To be able to continue to compete in an increasingly globalizing context, The Hague has to reconsider its strengths and weaknesses and use this knowledge to form a strategy for the future. The municipality is clearly aware of this and aims to increase its level of urban competitiveness by the creation of an innovation district. Although the district has yet to possess a strong brand, the municipal team working on the district appears to be aware of the possible strategies regarding such a brand.

Another concept that is clearly present, is the notion of creating an environment with a variety of uses. It is one of the main ideas Jacobs (1961) put forward for creating lively cities and appears to have made its way into the field of innovation. The municipality of The Hague is attempting to form such an environment in the CID by allowing for a variety of uses and is actively looking for new uses to strengthen the amount and variety of activities in the district. This notion of a mixed environment is strongly related to the concept of interaction climates, as described by De Hoog (2012), and the literature regarding innovation districts, as described by, among others, Katz & Wagner (2014).

Literature also suggests that the role of universities is of vital importance for the success of a district where innovation is one of the main goals (e.g. Katz & Wagner; Etzkowitz & Leydesdorff, 2000). As can be distilled from the way in which the Central Innovation District came to be, The Hague is clearly aware of the importance of universities and the concept of the triple helix.

Weak connection with theory

Apart from the concepts mentioned above, there appear to be some theoretical notions that are currently less present or unclear in the municipal strategy. One of these issues is the concept of 'innovation' itself. The municipality's perception of innovation appears to be mixed throughout different departments and a clear, communal vision on a specific type of innovation is currently lacking for the innovation district.

As has been explained in chapter 2.2, the term 'innovation' is in its nature an ambiguous concept. For the Central Innovation District in The Hague, this is no different. The different departments of the municipality of The Hague, working on the development of the CID, have varying views on what 'innovation' in the CID (or as many refer to it, "the 'I' in CID") actually means. A reoccurring issue, therefore, is what the main focus of the CID should be. When asked about what innovation within the CID should be, respondents had varying opinions on the matter. In its current state, the CID does not seem to have a main focus or business sector in which it specializes. As one interviewee mentions, innovation is not yet a part of The Hague's urban system and achieving this takes time. The Hague is still discovering what its strengths are and in which fields innovation can be found. Innovation is currently perceived as a broad concept within the municipality and takes different forms. Godin (2015) used the words of Koselleck (1969) to describe this phenomenon. He stated that innovation has

become “a widely used forceful expression whose lack of conceptual clarity is so marked that it can be defined as slogan”.

One interviewee mentioned the difference between process- and product innovation, as referred to in chapter 2.2. This is an essential categorization within the concept of innovation for the city of The Hague, since these different types of innovation can be recognized within the area of the CID. Where the Binckhorst area is more linked to innovations in the form of new products, the areas located around the Central Station can be linked more to process-related innovations. The latter type is also recognized by many within the municipality as an important aspect of the CID. Although this focus is not always explicitly mentioned, it does offer potential for the ‘I’ within the CID. These people consider innovation in The Hague to be less technological and materialistic, but rather about the way in which technology is used for innovation relating to governance and social issues. Innovation in The Hague is therefore considered to be less tangible, and more focused on the construction of smart instruments that can make processes run more smoothly. This type of innovation coincides rather well with the brand of the city (City of Peace, Justice and Security).

The municipality of The Hague has adopted an ‘economy first’ approach, where the main focus lies in the strengthening of the cluster of “peace, justice, security and governance”. As Wagner and Storring (2016) explain, an economic analysis of the assets of the district can help to support the claim of the strengths of the district. In The Hague, such an analysis could prove helpful to discover its main strengths (and weaknesses) and adjust its strategy accordingly.

Another somewhat unclear practice, currently, is how the built environment will stimulate innovation within the district. Considering that each economic sector and firm type has its own pathways for innovation (Arora et al., 2016), it will be important to combine the previously mentioned economic analysis with a detailed investigation regarding the needs the different entities have that allow them to innovate. Actors can then be clustered by means of this analysis and the built environment can be shaped accordingly.

6.2.4. Targeted actors

This section discusses the actors that the municipality of The Hague considers to be of value to the development of the innovation district. As mentioned in the previous section, the city of The Hague considers start-ups to have a potentially important role to play in the growth of the district. Apart from this group, the universities located in the district are considered to be key actors in the district.

In its attempt of creating commitment, the municipality has hired a consultancy firm to perform interviews with external stakeholders that have a (physical) presence in the district. Table 6 provides an overview of the firms/institutions that have been involved in this process at this point.

Stakeholder	Type	Sector
KPN	Firm	IT/Telecom
Secrid	Firm	Product Design/ Security
Siemens	Firm	IT/Telecom
Q42	Firm	IT
The Hague University of Applied Sciences	Educational institution	Mixed
University of Leiden	Educational institution	Governance
Royal Conservatoire	Educational institution	Music
Royal Academy of Art	Educational institution	Art
Haag Wonen	Housing association	Housing
Staedion	Housing association	Housing
Vestia	Housing association	Housing
Bink36	Business cluster	Mixed
Hague Security Delta	Business cluster	Security
World Trade Centre	Business cluster	Mixed
New World Campus	Business cluster	Impact Economy
HTM	Public transport	Transportation
ProRail	Public transport	Transportation
National Archive	National institution	Data
Central Government Real Estate Agency	Governmental institution	Real Estate

Table 6. List of stakeholders targeted by the municipality of The Hague

The main purpose of these interviews has been to discover what the view of these actors is on the development of an innovation district and the potential role they could play in bringing the district to a new level. Chapter 7 will further elaborate on the results of these interviews and the view of these (external) stakeholders.

Looking at table 6, it can be concluded that the municipality is attempting to reach out to a number of different types of stakeholders, operating in differing fields of business and research disciplines.

6.2.5 Conclusion

This section attempts to answer the research questions as put forward in the introduction of this chapter.

6. To what extent are the ambitions of The Hague based on the theory from sub-questions 1, 2, 3, 4 and 5?

It can be stated that although several concepts of theory regarding innovation districts are put into practice in The Hague, some concepts appear to be unclear. Table 7 provides an overview of both. One of the most prominent unclear practices is the debate concerning the definition of innovation. This lack of clarity can distract from the main purpose of the innovation district and makes it difficult to grow. Since no particular business sector or academic discipline has explicitly been chosen as a focus point or the CID, it is unclear which type of innovation should be stimulated in the district and what the district will promote to the outside world. This vagueness is therefore also an issue in the promotion of the district to innovating entities that could potentially settle in the district. Or to refer to popular marketing terms: He who does not choose, will not be chosen.

Strong connection with theory	Weak connection with theory
• Role of university • Awareness of urban competitiveness/globalization • Notion of interaction environments	• Definition of innovation • Chosen cluster • Brand of the district • Pathways of innovation

Table 7. Overview of connections with theory

7. What types of innovative entities is the CID targeted at?

As explained in the previous sections, the municipality has yet to define a specific business sector or research discipline for the district. The innovative entities that will form the base of the district are therefore also still relatively unclear. As the main idea of the district revolves around the three campuses, the University of Leiden and the Haagse Hogeschool are considered to be important stakeholders by the municipality. The area around the The Hague Security Delta is considered to be the third 'campus' of the district and therefore also regarded as an important actor in the district.

Apart from these actors, it is unclear which other firms or institutions will form the foundation of the innovation district. However, the municipality has developed a list of stakeholders with which their potential role in the district is discussed (see section 6.2.4). These stakeholders will be discussed in the following chapter.

8. What are the goals and policies of actors operating on the steering side regarding the district?

Category	Ambition
Infrastructure	• Decrease use of cars • Better division of use of modes of transport (modal split) • Optimal accessibility • Less space taken up by infrastructure • Increase walkability • Increase bike-ability • Sustainability
Functions & Amenities	• Mix of functions • Day & night activity • More housing • Start-up climate • Event-city • Student-city • Live- and work environment for young (entrepreneurial) people • City centre environment
Design	• Increase open appearance of buildings • Flexibility of space (suitable for multiple uses) • Inviting public space • Connect buildings with environment (main routes)
Image	• Create a strong brand • Commitment • Strong international reputation • Cluster for Peace, Justice, Security and governance
Other	• Start-up climate • Generate jobs for the metropolitan region • Sustainability • Inclusiveness

Table 8. Overview of the municipality's ambitions for the innovation district

Table 8 displays the ambitions of the municipality. Since the district is still in an early stage, policies mostly revolve around creating a clear vision for the area and connecting with important actors in the district. Physical interventions to further develop the district are the addition of housing, investing in infrastructure and public space and allowing for more types of uses in specific areas within the district.

7. Demand in the CID

7.1. Introduction

This chapter will elaborate on the results of the questionnaire that has been sent to different types of user groups in the Central Innovation District. The different levels of importance and satisfaction have been obtained as follows. First, the responses of the questionnaire have been categorized by attaching a number to each type of response:

Very unimportant = **1**; Unimportant = **2**; Neither important, nor important = **3**; Important = **4**; Very important = **5**;

Strongly disagree = **1**; Disagree = **2**; Neither agree, nor disagree = **3**; Agree = **4**; Strongly agree = **5**.

Then, the median and IQR of each aspect have been established. The median shows the general direction the answers are pointing to, while the IQR shows whether or not these answers are dispersed. With this in mind, the results have been analysed and conclusions have been drawn. The following sections will elaborate on the most significant findings of this analysis.

7.2 Importance

To be able to identify important aspects, only aspects with a median of either 4 or 5 *and* an IQR of either 0 or 1 have been considered as statistically significant, since this shows that the responses to these aspects contain a strong direction towards high levels of importance. Hereafter, frequency tables have been generated to determine which aspects have the highest total percentage of both 'Important' and 'Very Important'. The following sections will elaborate on the results for each of the user groups that participated in the survey. Please refer to the appendix for a detailed overview of the results of the questionnaire.

7.2.1 Students

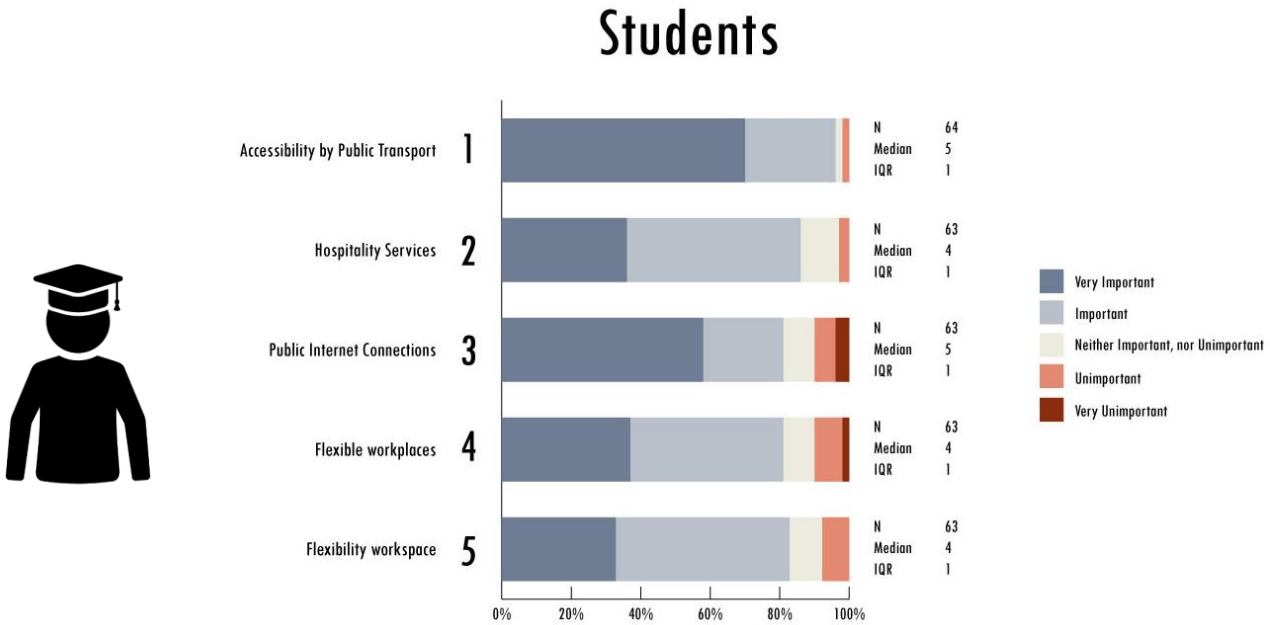


Figure 21. Most important aspects students

A total of 64 students have filled out the questionnaire. Figure 21 provides the five most important aspects to this group: (1) **Accessibility by public transport**; (2) **Hospitality services**; (3) **Public internet connections**; (4) **Flexible workplaces** and (5) **Flexibility of workspace**.

The first and most important aspect for students in the district is the **Accessibility by Public Transport** (N=64; Mdn.=5; IQR=1). Considering that an increasing amount of students decides to stay at home with their parents during their study period[4], it can be explained why the availability of a decent connection with surrounding cities is an important aspect for students. Moreover, taking into account that the amount of young people in the Netherlands that owns a car is low (CBS, 2017), this could possibly explain the low demand for a decent accessibility by car and a higher demand for public transport.

The second most important aspect for students appears to be the presence of **Hospitality Services**[5] (N=63; Mdn.=4; IQR=1). One of the main reasons students (and young people in general) are attracted to cities is the amount of amenities a city provides. One of these types of amenities is the industry of hospitality services, which offers students with a place to meet outside of their faculty building.

Hereafter comes the presence of **Public Internet Connections** (N=63; Mdn.=5; IQR=1). Considering that students generally work on laptops and regularly consult resources found on the internet to complete the assignments given to them by their studies, providing high quality internet connections appears to be a basic provision. Moreover, providing public internet connections give students the opportunity to work outside of their home and allows them to collaborate with other students while still being able to access online resources.

Fourthly, **Flexible Workplaces** (N=63, Mdn.=4; IQR=1) is regarded as important by students in the district. This high level of importance is in line with recent research regarding the preferences of students (Den Heijer et al., 2016), which concludes that the presence of physical workplaces is increasingly important to students, regardless of the place-independent possibilities of today's time.

Finally, students consider the aspect **Flexibility of Workspace** (N=63, Mdn.=4; IQR=1) to be important. Although similar to the aspect 'flexible workplaces', this aspect is different in the sense that it is about the physical possibilities a space gives in terms of the amount of different ways it can be used.

[4] https://www.cbs.nl/nl-nl/nieuws/2017/01/weer-minder-jongeren-verhuisd-naar-universiteitssteden

[5] Known in Dutch as 'Horeca', 'Hospitality Services' comprises the industry of Hotels, Restaurants and Cafes.

7.2.2 University Staff

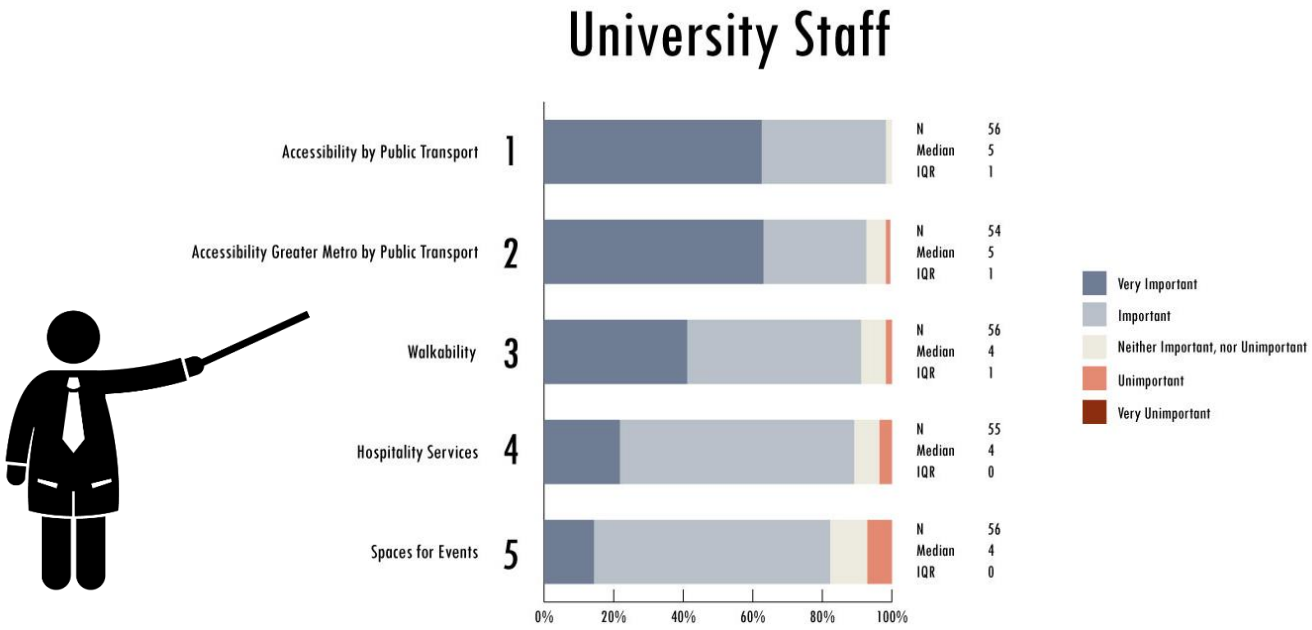


Figure 22. Most important aspects university staff

A total of 54 University Staff members have filled out the questionnaire. Figure 22 provides the most important aspects to this group: (1) **Accessibility by Public Transport**; (2) **Accessibility Greater Metropolitan Area by Public Transport**; (3) **Walkability**; (4) **Hospitality Services** and (5) **Spaces for Events**.

The most important aspect to university staff, similar to students, appears to be **Accessibility by Public Transport** (N=56; Mdn.=5; IQR=1), which emphasizes the importance of this aspect for universities. Moreover, university staff also considers the **Accessibility of the Greater Metropolitan Area** (the Randstad) **by Public Transport** to be important (N=54; Mdn.=5, IQR=1). This further adds to the importance of a good public transport network, both on a local and metropolitan scale. In comparison with students, university staff has also given more importance to **Walkability** (N=56; Mdn.=4; IQR=1).

Hospitality Services (N=55; Mdn.= 4; IQR=0), like students, has been given a high level of importance by university staff. Although a deeper analysis could prove useful to deduct the specific reason for the importance of this aspect, it can be placed in the context of a need for 'third places', as described by sociologist Ray Oldenburg (1989) as places where people spend time between home ('first' place) and work ('second' place).

Finally, university staff considers **Spaces for Events** to be an important aspect (N=56; Mdn.=4, IQR=0). Events like congresses, seminars or conventions are a place to meet fellow researchers and hear about the latest updates in particular fields of research. Such events are therefore a possible source of information and contacts that could assist university staff to further develop their field of expertise.

7.2.3. SMEs

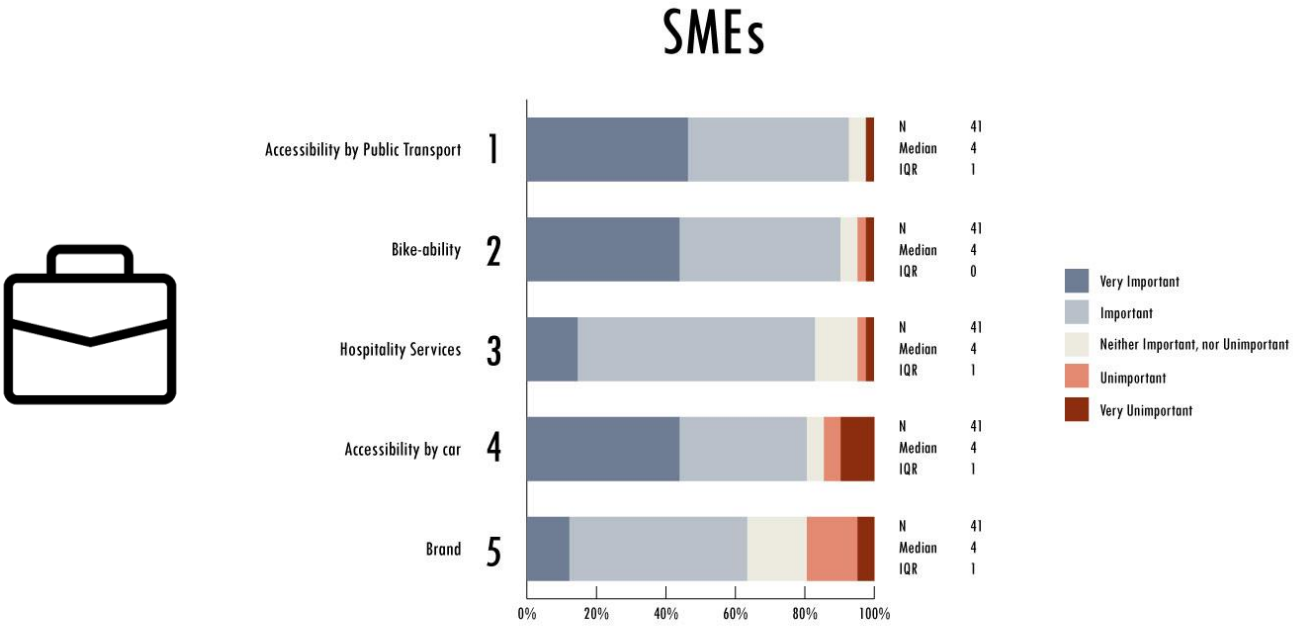


Figure 23. Most important aspects SMEs

The results of the SMEs show a somewhat different picture than the results of students and university staff (figure 23). A total number of 41 SMEs has responded to the questionnaire. To SMEs, the five most importance aspects are: (1) **Accessibility by Public Transport**; (2) **Bike-ability**; (3) **Hospitality Services**; (4) **Accessibility by Car** and (5) **Brand**.

Similar to both students and university staff, SMEs have given a high importance to **Accessibility by Public Transport** (N=41; Mdn.=4; IQR=1). Noteworthy is the high level of importance that has also been given to **Accessibility by Car** (N=41; Mdn.=4; IQR=1). Although one might expect that these aspects exclude one another, it appears that SMEs value both. **Bike-ability** (N=41; Mdn.=4; IQR=1) is also seen as an important aspect by SMEs, further emphasizing a need for a diversity of infrastructure.

Another recurring theme seems to be the high level of importance given to **Hospitality Services** (N=41, Mdn.= 4; IQR=1). A stronger difference in level of importance can be found in terms of the **Brand** of the area (N=41; Mdn.=4; IQR=1). Where students and university staff have not considered this aspect to be particularly important, SMEs give this aspect a relatively high level of importance.

7.2.4. Start-ups

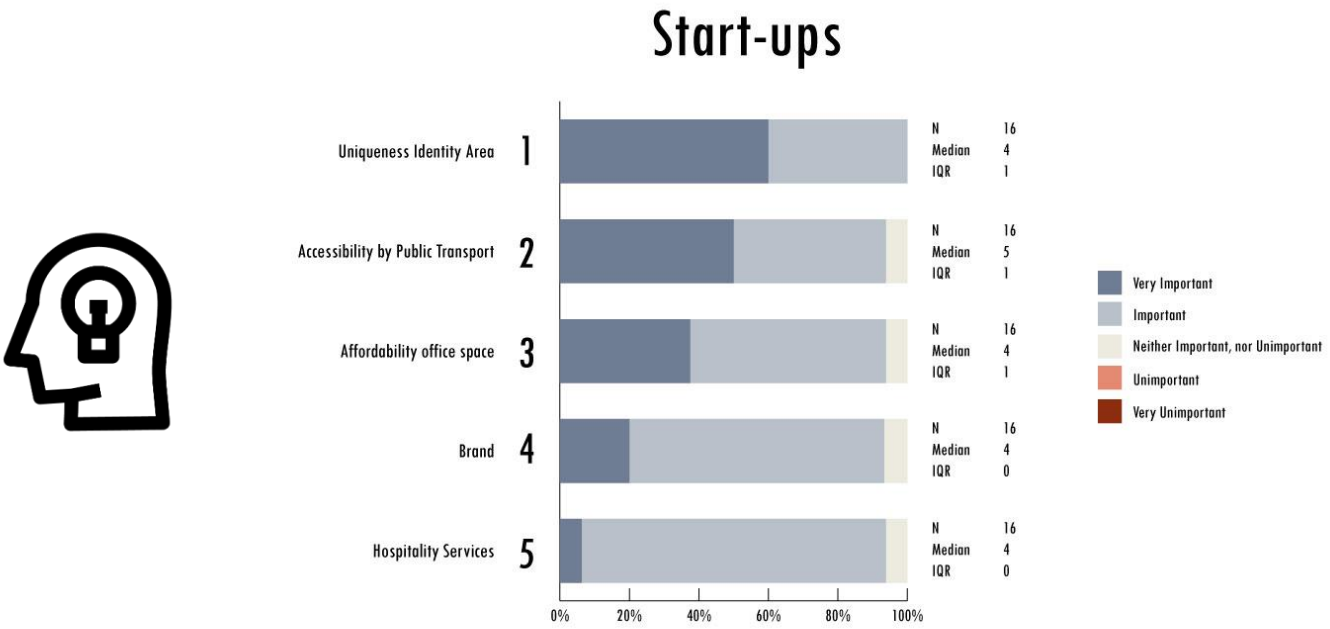


Figure 24. Most important aspects start-ups

The results of the final user group, start-ups, are shown in figure 24. A total number of 16 start-ups have filled out the questionnaire, out of which the following five aspects are regarded to be the most important: (1) **Uniqueness Identity Area**; (2) **Accessibility by Public Transport**; (3) **Affordability Office Space**; (4) **Brand** and (5) **Hospitality Services**.

The most important aspect to start-ups appears to be the **Uniqueness of the Identity of the Area** (N=16; Mdn.=4; IQR=1). Compared to the other user groups, a strong difference can be observed here. This observation, in combination with the high importance given to the **Brand** of the area (N=16, Mdn.=4; IQR=0), shows a preference for aspects related to the category of 'Image'. Research by Curvelo Magdaniel (2016) has confirmed this; It considers the identity to be one of the supply driven conditions for an innovation area.

Affordability of Office Space (N=16, Mdn.=4; IQR=1) is also considered to be an important aspect by start-ups. Considering that start-ups are young and generally have a low budget, it can be explained why it is important to them to have affordable office space. However, providing low-cost office space can pose a challenge in highly urban environments.

Finally, both **Accessibility by Public Transport** (N=16; Mdn.=5; IQR=1) and **Hospitality Services** (N=16; Mdn.=4; IQR=0) are also considered to be important by start-ups, marking the importance of these aspects for all user groups.

7.2.5 Similarities and Differences

It appears that the different user groups in the district have both common and different needs. This section will elaborate on both similarities and differences and aims to provide several conclusions regarding the demand of the different user groups in the district. Please refer to the appendix for the statistical analysis of this section.

Similar needs

All user groups have given a high level of importance to **Accessibility by Public Transport, Bike-ability** and **Hospitality Services**. High levels of connectivity by public transport and bike-friendly environments correspond with the basic concept of an 'innovation district', in the sense that they are centrally located areas and are "physically compact and transit-accessible" (Katz & Wagner, 2014). The need for hospitality services could be placed in the context of the theory regarding 'third places', as described by sociologist Ray Oldenburg (1989) (and others, e.g. Jeffres et al., 2009; Mehta & Bosson, 2010) as places where people spend time between home ('first' place) and work ('second' place).

Significant differences

Apart from the differences that have been observed from the analysis of the five most important aspects for each user group, several statistically significant differences have been observed. One of these is the difference in importance given to **Accessibility by Car**. While students and university staff have somewhat varied opinions on the importance of the accessibility by car (Mdn.=3, IQR=2), SMEs and Start-ups have given this aspect a relatively high importance (SMEs: Mdn.=4, IQR=1; Start-ups: Mdn.=4, IQR=0).

The **Brand of the Area** also shows different levels of importance between the user groups. While students and university staff show a somewhat dispersed image in terms of their responses (Mdn=3, IQR=2), SMEs and Start-ups show a stronger need for this aspect (SMEs: Mdn=4, IQR=1; Start-ups: Mdn=4, IQR=0).

The presence of **Flexible Workplaces** shows a significant difference between students and university staff. Where this aspect appears to be highly important to students (Mdn=4, IQR=1), university staff does not show particularly high levels of importance in relation to this aspect (Mdn=3, IQR=2).

Between SMEs and Start-ups, a significant difference can be observed in the respective levels of importance given to the presence of **Shared Facilities**. While SMEs have given this aspect a relatively low level of importance (Mdn=3, IQR=1), start-ups have given this aspect a significantly higher level of importance (Mdn=4, IQR=0).

Finally, a notable difference can be observed in the importance given to **Retail**. While start-ups have mostly given this aspect a low level of importance (Mdn=3, IQR=1), students consider the presence of retail to be significantly more important (Mdn=4, IQR=1).

7.3 Satisfaction

Not only has the questionnaire been used to identify the level of importance of the different aspects, it has also been used to see the level of satisfaction for each aspect in the district. To do this, the district has been divided into sub-areas. Each sub-area has its own characteristics and groups of actors that have responded to the questionnaire. The following sections will elaborate further on the weaknesses and strengths of each sub-area, as brought forward by the results of the questionnaire. Each aspect has been questioned by proposing a statement and asking each respondent to mark to which extent he/she agrees with the statement. For the sake of brevity, each of the statements has been reduced to the main concept. For the full statements of each aspect, please refer to the appendix. Moreover, only the most significant findings for each sub-area will be discussed. For a complete overview of the results of each individual sub-area, please refer to the appendix as well.

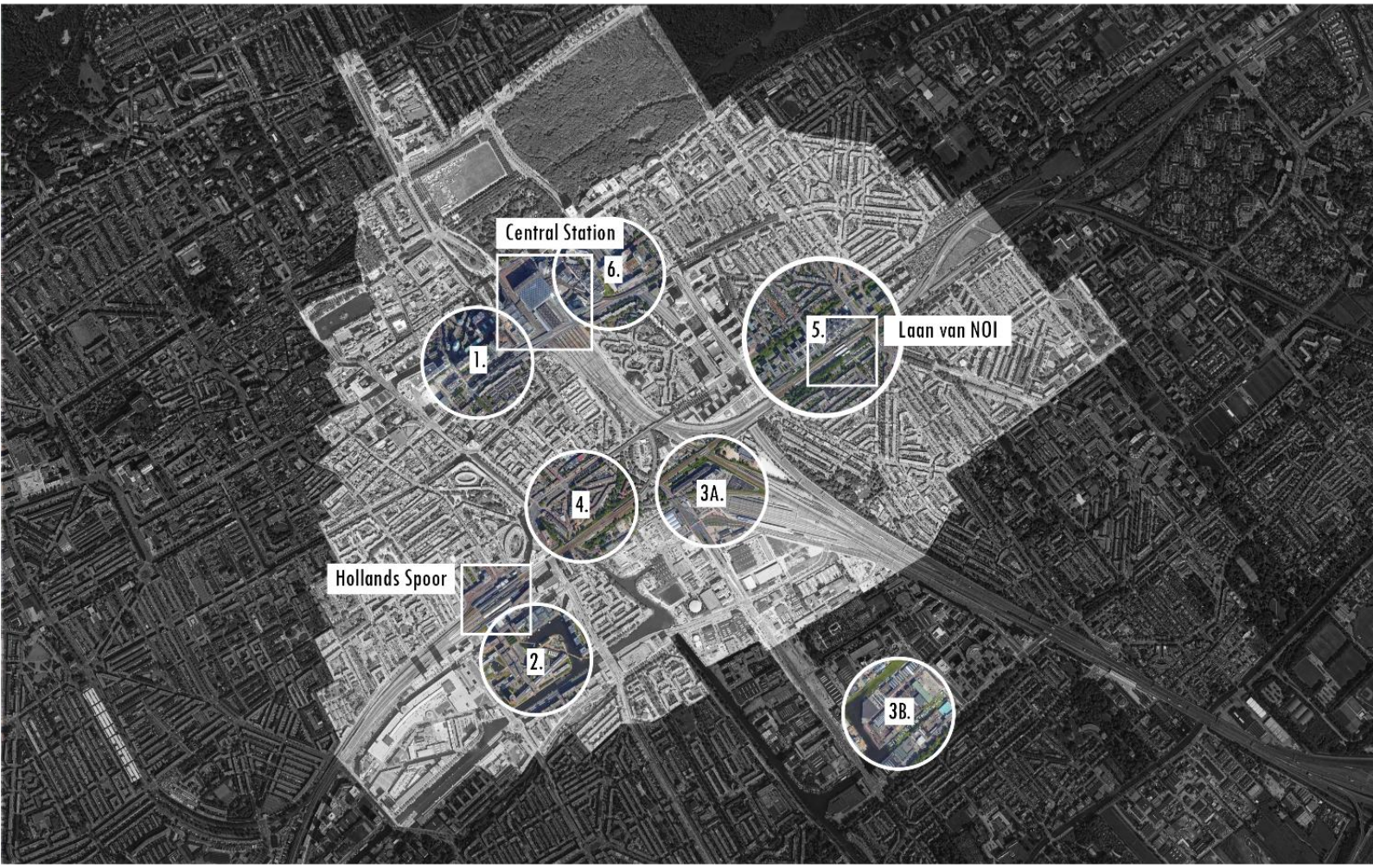


Figure 25. Sub-areas in the district

7.3.1 Overview

To give an indication regarding the results of the questionnaire for each sub-area compared to one another, the following graph has been developed:

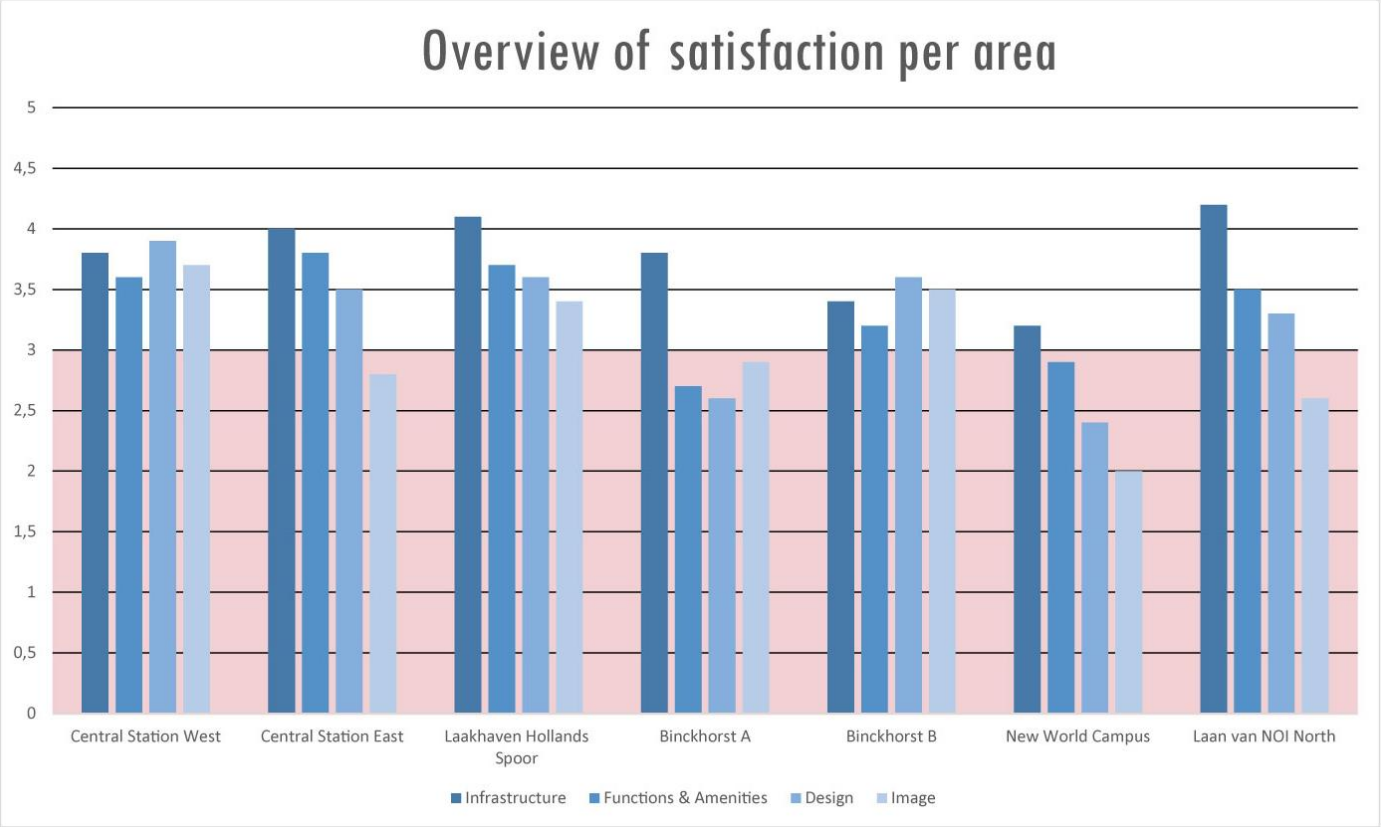


Figure 26. Overview of satisfaction per area

Figure 26 displays each sub-area with four columns that correspond with the four categories of the questionnaire: Infrastructure; Functions & Amenities; Design and Image. These columns have been constructed by calculating the average of the total of medians of each category. The numbers correspond with the responses given to each of the statements in the different categories. Therefore, a low number indicates a low level of satisfaction for a particular category while a high number indicates a high level of satisfaction. Because 3 corresponds with a neutral perception, this is regarded as a neutral number (neither positive, nor negative). Any number below 3 indicates that the general satisfaction regarding a specific category is negative. This graph already indicates shortcomings in specific categories for specific sub-areas, while other sub-areas show relatively high results in all categories. Area Binckhorst A, for example, shows low levels of satisfaction in the categories of Functions & Amenities, Design and Image, but does significantly better in terms of Infrastructure. The New World Campus shows a similar picture and especially image seems to be of a low level of satisfaction here. The following sections will elaborate further on the main conclusions that can be drawn for each sub-area.

7.3.2 Sub-area 1: Central Station West

The area located to the west of the Central Station is characterized by tall, modern buildings with a mixture of functions. It houses several ministries, as well as the municipality of The Hague, two faculties of the University of Leiden and the Royal Academy of Art.

A total of 43 students and 19 university staff members (from the University of Leiden and Royal Academy of Art) in this area have responded to the questionnaire. The following sections will elaborate on the most significant findings of this area.

High level of infrastructure and amenities

Most of the aspects in the category of infrastructure show high levels of satisfaction, in particular the connectivity by public transport with the greater metropolitan area. The location of the area (next to Central Station) in combination with the design of the public space seems to assist the area in this regard. Especially **Diversity of Infrastructure** (Both groups: Mdn=4, IQR=0) seems to be of a high level, but **Walkability** (Both groups: Mdn=4, IQR=1) and **Accessibility Randstad by Public Transport** (Students: Mdn=4, IQR=1; Staff: Mdn=5, IQR=1) also show a relatively high satisfactory level. **Bike-ability** also shows relatively high results, although responses vary somewhat between the different user groups (Students: Mdn=4, IQR=2; Staff: Mdn=4, IQR=0). **Accessibility by car** has a considerably lower score than the other aspects (Students: Mdn=3, IQR=1; Staff: Mdn=2, IQR=1), but considering the low level of importance given to this aspect by both user groups, one can question whether this is an issue.

The area is located in close proximity of the city's centre and its amenities. It benefits from this, in the sense that people can easily make use of the city centre's shops, bars, restaurants, etc. This reflects in the ratings given in the category of functions and amenities, where especially the amount of **Hospitality Services** is considered to be of a satisfactory level (Mdn=4, IQR=0). Moreover, students consider the amount of **Retail** to be sufficient (Mdn=4, IQR=1). Taking into account the high level of importance given to both these aspects by especially students, these can be regarded as some of the area's main strengths in relation to this user group.

Students and university staff experience the provision of spaces for events differently

While university staff appears to be satisfied with the amount of **Spaces for Events** the area houses (Mdn=4, IQR=1), students show a slightly more pessimistic image (Mdn=3, IQR=1). It raises the question to what extent the available spaces for events are being used for events that students are able to participate in, or whether these events are rather focused on the professional field.

The uniqueness of the area (especially on an international level) is questionable

Considering that most of the buildings and the public space in this area are relatively new, it might come as no surprise that the **Modern Appearance** and **Quality of the Materials** show high levels of satisfaction. However, the **Uniqueness of the Identity** of the area shows relatively low levels, especially on an international level (Students: Mdn=3, IQR=2; Staff: Mdn=3, IQR=1). This is a common observation in the debate regarding the identity of newly built areas in cities (e.g. Verheul, 2015 & Koolhaas, 1995) and raises the question to what extent newly built areas (or cities) are able to create distinctive identities in contemporary urban practices. Although students and university staff might not particularly find this to be important, SMEs and start-ups do. Therefore, when considering mixing the different user groups together, this is something to take into account.

A lack of parks

Both user groups show particularly low levels of satisfaction regarding the presence of parks. Although large parks like the Malieveld or Koekamp are relatively close, the results show that a large portion of

the area's users does not agree that the amount of parks is sufficient (Both groups: Mdn=3, IQR=2). Although this aspect cannot be considered to be one of the main priorities of either user group, it does show significant levels of importance from both user groups, which makes it something to take into consideration.

7.3.3. Sub-area 2: Laakhaven Hollands Spoor

This area is located south of the train station and public transport hub Hollands Spoor, which connects the area both locally and on a metropolitan level of scale. The Hague University of Applied Sciences has a strong physical presence here and is the source of a vast amount of students in the area. The public space is characterized by a large square in the centre of the area and the canals that surround it.

A total of 23 students and 26 staff members from the university (University of Applied Sciences The Hague) in this area have filled out the questionnaire. These are the most significant findings of the analysis of the results for this area:

Infrastructure and hospitality services are of a high level

Similar to Central Station West, this area scores high in terms of infrastructure. Considering its location next to train station Hollands Spoor, the high ratings given to the **Accessibility of the Randstad by Public Transport** can be explained, although students appear to be somewhat less convinced about the sufficiency of this aspect than staff is (Students: Mdn=4, IQR=2; Staff: Mdn=4, IQR=1). The area also appears to do well in terms of **Walkability** and **Bike-ability** (Students: Mdn=4, IQR=0; Staff: Mdn=4, IQR=1), which could possibly be explained by the considerable amount of square meters reserved for slow traffic around the university's main building. Adding this together, it can be explained why **Diversity of Infrastructure** also shows high numbers and the respondents have given an overall high rating to this aspect (Students: Mdn=4, IQR=1; Staff: Mdn=5, IQR=1).

What is more, both students and university staff seem to agree that the amount of H**ospitality Services** in the area is sufficient (Both groups: Mdn=4, IQR=1). Possible explanations for this can be found in the presence of a hospitality services close to the university building, as well as the cafeteria of the university itself. Moreover, more cafés and restaurants can be found north of the train station Hollands Spoor, within walking distance.

High diversity in inhabitants

Both user groups claim that the **Diversity of Inhabitants** in the area is high (Students: Mdn=4, IQR=0; Staff: Mdn=4, IQR=1). The area contains a diversity of types of housing, including (international) student housing, social housing and apartments for the medium and high sector. Compared to the other areas, Laakhaven Hollands Spoor show a particularly high level for this aspect.

A lack of parks and a good image

The amount of **Parks** shows a poor result in the questionnaire (Students: Mdn=3, IQR=1; Staff: Mdn=2, IQR=1). A brief analysis of the area explains this, showing that it is mostly surrounded by water and the nearest park is not within walking distance. A similar result has been observed for area Central Station West, where a high amount of retail, hospitality services and housing have seemingly come at the cost of the provision of parks.

In terms of image, especially the **Uniqueness of the Identity on an International Level** shows low levels (Both groups: Mdn=3, IQR=1), where particularly university staff shows a low degree of satisfaction when taking into account the frequency distribution for the answers (42% does not agree that the

identity of the area is unique on an international level, while only 15% does). It shows a need for a more unique identity for the area and more parks.

The sufficiency of the amount of flexible workplaces and spaces for events for students is questionable

Considering that especially **Flexible Workplaces** are an important aspect to students, the relatively poor result this aspect shows in this area reveals a possible option for improvement. Although the median and IQR do not show particularly low levels of satisfaction (Mdn=4, IQR=1), an analysis of the frequency table shows that these aspects score relatively low compared to the other aspects (see appendix for a complete overview of all aspects).

Spaces for Events are considered to be somewhat less important to students, but there appears to be a significant difference in the results of this aspect between students and university staff (Both groups: Mdn=4, IQR=1): 52 percent of students agrees that the amount of spaces for events is sufficient, while 69 percent of university staff agrees with this. A similar observation has been made for the area Central Station West.

7.3.4. Sub-area 3A & 3B: Binckhorst

The Binckhorst is an industrial area, characterized by large warehouses and factory buildings. In recent years more and more entrepreneurs have started to settle in the area, especially in the buildings Bink36 and Caballero Fabriek. Both buildings offer space to small firms in the district and mark an upcoming revitalization of the area. The following sections will elaborate on the results of the responses of both firms from the Bink36 building (located in the northern part of the district) and the Caballero Fabriek (located in the southern part of the district). A total of 43 SMEs have filled out the questionnaire, out of which 25 are located in the Bink36 building and 18 in the Caballero Fabriek.

Buildings show a high level of flexibility of office/workspace

Considering the industrial design of both the Bink36 building and the Caballero Fabriek, it might be explained why this aspect shows such a relatively high result. Similar to students, SMEs and start-ups appear to consider this aspect to be important. Both the respondents from the Bink36 building (Mdn=4, IQR=1) and the Caballero Fabriek (Mdn=4, IQR=0) regard this aspect to be of a satisfactory level.

While accessibility by car is of a high level, other infrastructural aspects are lacking

The users in the area consider the **Accessibility by Car** (Mdn=4, IQR=1) to be of a high level. Since this is an important aspect to SMEs and start-ups, this can be regarded as one of the area's main strengths for these particular user groups. However, the other aspects in the category of infrastructure show significantly lower results. Especially **Walkability** shows poor results (Mdn=3, IQR=2), which might be related to the area's orientation on cars as the main mode of transportation. Moreover, the area around the Caballero Fabriek appears to be significantly less connected with the Randstad by public transport than the area around the Bink36 building (Bink36: Mdn=4, IQR=1; Cab. Fab.: Mdn=3, IQR=2).

A lack of parks, hospitality services and retail (i.e. a mixture of functions)

From the analysis of the results of the questionnaire, it becomes clear that the Binckhorst area is lacking **Parks**, **Hospitality Services** and **Retail**: none of these aspects show a median higher than 3 (with the exception of hospitality services near the Caballero Fabriek). In other words, the area is lacking a certain level of mixture in functions. Although the area around the Caballero Fabriek shows somewhat higher levels in terms of hospitality services, the overall result is poor. Parks and retail are either completely lacking or modestly present, which significantly reduces the amount of 'life' in public spaces.

The area is considered to be fairly unique on a national level, but less on an international level

In the category of image, the **International Reputation** and the **Uniqueness of the identity on an International Level** show particularly weak results (medians do not exceed 3). Although the area is found to be relatively unique on a national level, SMEs and start-ups in this area apparently find it to be less unique when looking over the border. However, although the differences are modest, the area is considered to be more **Unique on a National Level** than on an international one. When developing the transformation strategy for this area, one can take this into account, as it offers opportunities for the image of the area on a national level.

Buildings have an introvert character and the amount of unexpected encounters is low

As the Binckhorst is an industrial area, it contains many industrial buildings and is set up to favour the use of cars and trucks. As a consequence, buildings are generally introvert and life in public spaces is low. This reflects in the level of **Transparency** of the buildings and the amount of unexpected encounters people claim to have, which show particularly poor results: Transparency (Bink36: Mdn=2, IQR=1; Cab. Fab.: Mdn=3, IQR=2), Unexpected encounters (Bink36: Mdn=3, IQR=1; Cab. Fab.: Mdn=2, IQR=1),

7.3.5. Sub-area 4: New World Campus

The New World Campus is located in the neighbourhood Rivierenbuurt-Zuid and is in close proximity of the public transport station Hollands Spoor. Due to its proximity to this transport hub, however, it is surrounded by train tracks. This poses a challenge for the area with regard to its connectivity to surrounding areas. One of the main potential sources of innovation in this area is the New World Campus, a historical building that offers space to small businesses that aim to contribute to a more sustainable world. A total of seven SMEs located in the New World Campus have filled out the questionnaire. The most significant findings are presented here.

The area is focused on 'fast' traffic (cars, public transport) rather than 'slow' traffic (pedestrians, cyclists)

As the results show, the area scores well in terms of **Accessibility by car** (Mdn=4, IQR=1) and **Accessibility of the Randstad by Public Transport** (Mdn=4, IQR=1). However, it shows significantly lower results for **Walkability** (Mdn=2, IQR=1) and **Bike-ability** (Mdn=2, IQR=2). Considering the high importance given to these aspects (especially bike-ability) by SMEs and start-ups, this can be regarded as one of the area's potential points of attention.

Interior versus exterior

While the building of the New World Campus appears to meet the needs of its users, the area around it shows significantly less positive results. Although the area is relatively close to the city centre, the aspects in the category of functions and amenities show particularly low results. For example, the amount of **Parks** (Mdn=2, IQR=1), **Hospitality Services** (Mdn=2, IQR=1) and **Retail** (Mdn=2, IQR=0) all show weak results.

Design of public space does not particularly reflect the physical characteristics of an innovation district

The aspects in the category of design also show poor results. The users of the area do not consider the buildings in the area to be **Transparent** (Mdn=2, IQR=1), nor do they think the **Quality of the Materials** of the public space is high (Mdn=2, IQR=1). The **Modern Appearance** of the public space is also not considered to be particularly high (Mdn=2, IQR=2), although the IQR of 2 shows that responses are somewhat dispersed.

Weak image

In the category of image, all aspects show particularly weak results. The **Uniqueness of the Identity** of the area (neither on a national, nor an international level), nor the **International Reputation** and **Overall Attractiveness/Quality** show high results (All: Mdn=2, IQR=1). It emphasizes that although the New World Campus itself generally appears to meet the needs of its users, the area around it shows less positive results.

7.3.6. Sub-area 5: Laan van NOI North

One of the main features of this area is the train station Laan van NOI. This, in combination with the proximity of the highway, provides the area with a high level of accessibility by both public transport and car. Within the area, several firms are located. Siemens and Jacobs have an office here, but the The Hague Security Delta and research institutions such as NWO and DANS are also located here. The vacancy of the former building of the ministry of social affairs and the low level of attractiveness of the area in the eyes of the municipality make it into a challenging, yet promising area. A total of 8 responses have been collected in this sub-area. The following sections will elaborate on the most significant findings.

Infrastructure is of a high level

The aspects in the category of infrastructure show particularly high results. Given the area's location next to the train station (that connects the area with the greater metropolitan area by public transport) and the proximity of the highway, one can explain this. Especially **Accessibility of the Randstad by Public Transport** shows a positive image (Mdn=5, IQR=0), but aspects such as **Accessibility by Car** (Mdn=4, IQR=1), **Bike-ability** (Mdn=4, IQR=1) and **Walkability** (Mdn=4, IQR=0) also show relatively high results.

Lack of parks

Similar to the other areas in the district, one of the less positively rated aspects is the amount of **Parks** in the area (Mdn=3, IQR=1). Although the area does contain a significant amount of 'green' spaces (parts of the public space with grass and trees), the users of the area do not consider the amount of actual parks to be sufficient. It is exemplary for the overall lack of parks that has been observed throughout the district.

Low amount of unexpected encounters

Compared to other areas, the amount of **Unexpected Encounters** people claim to have in the area is relatively low (Mdn=3, IQR=1). The low amount of amenities, such as retail and parks, might play a role in this. The lack of these amenities, similar to the Binckhorst area, can decrease the amount of activity in public space, leading to a lower probability of unexpected encounters.

Low uniqueness of identity

In terms of image, especially the uniqueness of the identity of the area shows low results. Both on a national (Mdn=2, IQR=0) and an international level (Mdn=2, IQR=0), the users of the area do not find the identity of the area to be particularly unique. Since this aspect appears to be specifically important to SMEs and (more so) to start-ups, this aspect offers a potential option for improvement.

7.3.7. Sub-area 6: Central Station East

Central Station East is located on the east side of the Central Station. It houses institutions that can be related to the Peace/Justice sector, among which UNICEF, CICC, HiiL and the Court of The Hague. Moreover, the area contains several educational/knowledge institutions (University of Leiden, InHolland, University, Royal Conservatory & TNO). The area is also the location of the Dutch Ministry

of Economic Affairs. A total of 17 people from different institutions have responded to the questionnaire. The following sections will elaborate on the most significant findings.

High levels of accessibility, bike-ability and walkability

This area, similar to Central Station West, is located next to the Central Station. This offers an explanation regarding the positive results seen in the category of infrastructure. Especially the **Accessibility of the Randstad by Public Transport** shows high results (Mdn=5, IQR=0). However, **Bike-ability** (Mdn=4, IQR=0) and **Walkability** (Mdn=4, IQR=1) can also be regarded to be of a high level compared to other areas in the district (e.g. Binckhorst).

Functions and amenities are sufficiently present

According to the users of this area, most aspects in the category of functions and amenities are sufficiently present. Especially **Hospitality Services** (Mdn=4, IQR=1) and **Retail** (Mdn=4, IQR=1) show relatively high results.

The Malieveld and Koekamp are two parks that are in close proximity of the area, which shows in the results. Although the results concerning the amount of **Parks** are somewhat dispersed (Mdn=4, IQR=2), the general opinion is positive. With this result, this area shows the highest number in terms of satisfaction regarding the sufficiency of the amount of parks compared to the other areas in the district.

Identity not considered to be unique, especially on an international level

Similar to the area Central Station West, this area shows poor results regarding the uniqueness of the identity of the area. Although the results concerning the **Uniqueness on a National Level** are somewhat dispersed (Mdn=3, IQR=2), on an **International Level** the identity of the area is considered to be even less unique (Mdn=3, IQR=1). It raises the same question brought up in the first area that was discussed (Central Station West), which is about the level of authenticity newly built areas are able to convey amongst its users.

Opinion on transparency undecided

One of the important aspects when talking about “open innovation” is about the physical **Transparency** buildings have. In this particular area, the opinion regarding this aspect does not show particularly strong, nor weak results (Mdn=3, IQR=1). Half of the respondents (50%) does neither agree, nor disagree that the buildings in the area are transparent, while the other half is dispersed between ‘agree’ (30%) and ‘disagree’ (20%).

This can be explained when analysing the physical appearance of the buildings in the area. Although new buildings (such as the New Babylon building) show high levels of transparency, old buildings in the area (e.g. Ministry of Foreign Affairs) are generally more introvert and appear to have a less strong connection with their environment.

7.3.8 External Actors

In an attempt to collaborate with stakeholders in the district, the municipality of The Hague hired a consultancy firm to conduct interviews with the different actors. Table 6 (p. 58) shows an overview of the actors involved. In addition to these interviews, two other external actors have been interviewed (table 9). The following section will elaborate on the results of that research, as well as the results of the interviews with external actors performed for this thesis.

Results interviews commissioned by municipality

As also mentioned by the municipality, one of the main aspects lacking in the current situation is the mixture of functions in many of the areas within the district. The firms and institutions interviewed

also consider this to be an important aspect, further emphasizing the need to improve the mixture of uses in the district.

Related to the mixture of functions is the need for environments that spur interaction. In its current state, the district appears to be lacking such environments and the firms and institutions in the district mention this as an important aspect for the design of the public space. Such an environment has much to do with walkability, also mentioned by the firms and institutions in the district.

Affordability is mentioned as an important aspect for both businesses and (potential) inhabitants. Firms currently present in the district would like to see firms of different phases of life in the district, which means the provision of low budget space for start-ups or young firms will be important.

Another important aspect that currently appears to be missing, is het network culture in the city of The Hague. Firms and institutions mention that such a culture is currently lacking in The Hague, while very much present in a city like Amsterdam. Setting up a network for the innovation district will therefore be one of the main challenges for the municipality in the creation of the district. A notable observation here is that firms are hardly adopting a pro-active attitude and seem to be looking at the municipality for a change in the current system.

Results interviews own research

External actors	
Peter Tjia	Senior Business Developer at Innovation Quarter
Sabrina Lindemann	Founder I'm Binck platform
Expert	
Ronald Wall	Professor Erasmus University

Table 9. External actors interviewed

In order to generate additional information regarding the district, two external actors and a professor in this research discipline have been interviewed. Leading topics of these interviews have been their role in the district and their view on the municipality's plan for the innovation district. The results of these interviews are discussed in the following sections.

Although the Binckhorst area is mostly known as an industrial area with high levels of potential, development in the area appears to be slow. Entrepreneurs and developers in the area claim the municipality is not keeping up with their pace and they would like to see more concrete plans for the area. Such plans would provide clarity for this group and provide them with the opportunity to construct concise development plans for the area. As the northern zone of the Binckhorst area is considered to be one of the potential zones of the innovation district and developers appear to be eager, it will be important to create clarity for this area.

Several interviewees have mentioned the possibility of creating a 'living lab' in the district. Such a living lab could explicitly bring to light the innovation in the district and could help to strengthen the growth of the image of an innovation district. The Binckhorst Festival (as mentioned in chapter 6) is an example of how innovation can be shown to the outside world.

Finally, as has been mentioned before, a clear, explicit focus on a specific business sector or knowledge discipline appears to be lacking and this is also mentioned by the interviewees. Although the potential of the area is recognized by most interviewees, the confusion concerning the main strengths of the district is not beneficial to the municipality's attempt to create commitment. Wall (Personal communication, May 12, 2017) confirms this and claims that the city of The Hague should position itself by using a number of powerful economic sectors.

> *"The Hague should position itself by using a number of powerful economic sectors"*
>
> - R. Wall, Head of Urban Competitiveness and Resilience Erasmus University

7.4 Conclusions

This chapter has attempted to answer the following research question:

9. How do innovative entities, located in the innovation district, rate their current built environment and the current image in relation to their goals and needs?

In doing so, two main types of data have been gathered: (1) The level of importance per aspect of the physical environment and (2) The level of satisfaction of the aspects per sub-area. From the analysis of this data, the following conclusions can be drawn:

1. Accessibility by public transport, bike-ability and hospitality services are key aspects for all user groups; overall lack of parks

The results of the questionnaire have shown that these aspects are highly important to all user-groups (students, university staff, SMEs and start-ups). This corresponds with the basic concept of an 'innovation district', in the sense that they are centrally located areas and are "physically compact and transit-accessible" (Katz & Wagner, 2014). The need for hospitality services could be placed in the context of the theory regarding 'third places', as described by sociologist Ray Oldenburg (1989) as places where people spend time between home ('first' place) and work ('second' place).

In The Hague, these aspects mostly appear to be sufficiently present according to the users of the district. However, strong differences can be observed between the different sub-areas in the district. The areas around Central Station, for example, show high levels of accessibility of the Randstad by public transport, bike-ability and hospitality services. The Binchorst area, however, shows significantly lower values regarding these aspects. What is more, the south of the Binckhorst area appears to be even less connected with the Randstad by public transport. It is therefore important to consider the weaknesses and strengths of each individual sub-area rather than considering the district as a unity.

Another observation is that five out of the six areas that have been analysed show a lack of parks according to its users. The only area that does show a sufficiency in the amount of parks is Central Station East, which can be explained by the large parks that are within walking distance of the area.

2. A combination of physical, economic and network assets is needed

As put forward by Katz & Wagner (2014), innovation districts are comprised of physical, economic and network assets. Although this research focuses on the physical aspects of innovation districts, it acknowledges that a combination of these assets is necessary. Firms and institutions in the district in

The Hague have a wait-and-see attitude regarding the concept of the innovation district, in the sense that they leave it to the municipality to take the lead in setting it up. Moreover, according to firms and institutions in the district, there appears to be a lack of a 'network culture' in The Hague. The results of the questionnaire confirm this, being that start-ups do not appear to work together often with other start-ups (neither in the city, nor in their building). What is more, interviews with firms in the New World Campus have revealed that collaboration between firms within the building is almost non-existent. Although the physical conditions in this building are of a high level, if the importance of collaboration is not acknowledged, the network will also be weak and firms might still be mostly focused on themselves.

"We need common ground to collaborate"
– Community member New World Campus

Another observation in this regard can be made about the amount of unexpected encounters different user groups claim to have in the same environment. While students in the area Laakhaven Hollands Spoor appear to have a high number of unexpected encounters, university staff does not. This raises the question as to what makes it that university staff experiences the same environment in a different way. Explanations might possibly be found in the stricter working hours of staff, or simply the set-up of university curricula which requires students to take classes at different locations. However, the main conclusion that can be drawn from this is that different user groups experience their environments differently. A physical environment that evokes unexpected encounters for one user group does not necessarily work the same for another user group. This knowledge, combined with the observations regarding the network culture in The Hague, makes it important to consider the combination of both physical aspects and other (economic/institutional) aspects and programming (e.g. conferences, seminars, etc.) that creates both unexpected encounters and improves the network in the district.

3. User groups are dispersed throughout the district

Although some areas show a mixture of groups (e.g. Beatrixkwartier/Laan van NOI), the overall mix is low. Universities are not particularly well mixed together with (international) firms, SMEs and start-ups. The Hague University of Applied Sciences, for example, is located in an area where the amount of firms, SMEs and start-ups is low. Eastwards, the Binckhorst area shows a strong focus on SMEs and start-ups, but no students.

The concept of an innovation district, where user groups are mixed together, is therefore not particularly strongly present in this sense. Firms confirm this, and mention they would like to see more of a mixture of firms in different phases of business. One of the areas that does show a slightly stronger mix of user groups, is the area around station Laan van NOI, where large (international) firms are mixed together with younger firms. However, since office space is relatively expensive, these firms are generally those that have already proven themselves (scale-ups).

The analysis of the results of the questionnaire has also shown that affordability and image are particularly important to start-ups. Moreover, SMEs and start-ups have given a high level of importance to accessibility by car, which does not particularly mix well with highly urban environments with a focus on public transport. Because of the importance of affordability, start-ups are often left with a low variety of options to choose from in terms of their potential location. In The Hague, this is also evident. The Binckhorst and the New World Campus are both areas where a large number of SMEs and start-ups are located. However, both these areas show poor results in terms of functions and amenities and design. In terms of image, the Binckhorst area shows relatively high results in terms of

the uniqueness of its identity on a national level. A recent article[6] confirms this, in the sense that the community of the Binckhorst area is pleading for a preservation of the identity of the area. Rather than demolishing the area in its entirety and rebuilding from scratch, the users of the area would like to see a sense of authenticity in the plans for the area.

4. Awareness of the municipality's plans for the district and commitment among firms and institutions is low

The results of the questionnaire have revealed that only 19 percent of the total amount of respondents had heard about the municipality's plans for the Central Innovation District prior to filling out the questionnaire. This shows the level of work that needs to be done in terms of creating commitment amongst the district's users. What is more, interviews (and observations) have revealed that there appears to be a somewhat condemnatory attitude towards the municipality of The Hague and its willingness to intervene/steer. The general conception is that the users of the district should be allowed to have more freedom to arrange things themselves. Moreover, users appear to consider the municipality to be slow, in the sense that the development of plans for specific areas or policies take too much time before they are being put into practice. This is also apparent in the Binckhorst area, where it is said that the municipality is too slow in the development of a decent zoning plan for the area. This furthers emphasizes the lack of commitment in the district for the plans of the municipality and poses a challenge for the development of the innovation district.

[6] https://www.gebiedsontwikkeling.nu/artikelen/herontwikkeling-binckhorst-niet-vertrutten-maar-authentiek-spannend-en-divers/

8. Ambitions versus results

8.1 Introduction

This chapter aims to provide an insight into the comparison between the ambitions of the municipality and the results of the questionnaire. In doing so, it attempts to answer the following research question:

10. To what extent are the goals and policies of the actors operating on the steering side in line with the demand of innovative entities operating in the innovation district and what tools could the municipality use to bridge the gap?

This question has been attempted to be answered in two parts. First, an analysis will be performed in which the municipality's ambitions are measured up against the physical state of the district (using the results of the questionnaire). Hereafter, in section 8.3, literature will be consulted to determine which tools the municipality could leverage to further develop the district.

8.2 Ambitions versus current supply

It can be concluded that some areas in the Central Innovation District need more work than others in order for the municipality's ambitions to be fulfilled. A noteworthy observation is the amount of respondents who are aware of the innovation district being set up. Out of all the respondents, a total of ***19 percent*** had heard about the Central Innovation District before filling out the questionnaire. This shows a significant amount of work is still to be done in terms of creating awareness and commitment for the district. Comparing the municipality's ambitions (table 8) to the results of chapter 7, several conclusions can be drawn. The following sections will elaborate on each of these comparisons, divided by the different categories of the questionnaire.

Infrastructure

In terms of infrastructure, the municipality's ambitions are to decrease the use of cars and create a district that is optimally accessible by public transport. Moreover, the district should have a physical environment that is both walkable and bike-able and have a high modal split.

The results of the questionnaire have shown that one of the main strengths of the district is its infrastructure. Apart from the Binckhorst area, all sub-areas show high levels of satisfaction regarding accessibility by public transport. Walkability and bike-ability, however, show low levels of satisfaction in both the New World Campus area and the Binckhorst area.

In order for the municipality to achieve its ambitions, improvements can be made in terms of the walkability and bike-ability of the Binckhorst and the New World Campus area. What is more, the Binckhorst area could benefit from an increased connectivity by public transport. The areas around the Central Station and Laakhaven Hollands Spoor show particularly high levels of satisfaction in terms of walkability, bike-ability and connection with public transport.

Functions & Amenities

In this category, the main ambitions of the municipality are the creation of an environment with a high mixture of functions and amenities. The questionnaire has shown that this ambition is partly fulfilled in some areas, but less so in others.

In both areas around the Central station, there appears to be a relatively high mixture of functions and amenities compared to the other areas. Another area that appears to be doing well in this regard is Laakhavens Hollands Spoor. The other sub-areas, however, show low levels of satisfaction for most of

the aspects in this category. Especially the Binckhorst and the New World Campus show low levels of satisfaction in this regard.

One of the ambitions of the municipality is to create a start-up climate. The questionnaire has indicated that start-ups (along with the other user-groups) consider the presence of hospitality services to be particularly important. In the Binckhorst area, however, such hospitality services are hardly present. What is more, the users of this area consider the mixture of functions to be relatively low (Binckhorst A: Mdn=2, IQR=1; Binckhorst B: Mdn=3, IQR=2).

Design

In terms of design (of both public space and individual buildings) it appears that, again, the Binckhorst and the New World Campus area are the areas that need the most amount of work in order to achieve the municipality's ambitions.

High levels of transparency, an inviting public space and buildings that connect with their environment are all unapparent in both these areas. However, one of the aspects that ís present in these areas, and is considered to be important, by SMEs and start-ups, is the level of flexibility of the office space. Both the Binckhorst and the New World Campus area show high levels of satisfaction in terms of the flexibility of the space that SMEs and start-ups occupy.

Good practices can also be found in the two areas around the Central Station and Laakhaven Hollands Spoor. Here, both quality and modern appearance of public space shows high levels of satisfaction. What is more, especially Central Station West shows high levels of satisfaction in terms of the level of transparency of the buildings in the area.

Image

In this category, the ambitions of the municipality mostly lie in the creation of a strong brand/identity and creating commitment amongst the actors in the district.

The results of the questionnaire have revealed that none of the areas show particularly positive results in terms of their image. However, the Binckhorst area shows relatively high levels of satisfaction in terms of the uniqueness of the identity on a national level (Mdn=4, IQR=1). This indicates a potential regarding a preservation of the area's identity and maintaining this uniqueness. In terms of commitment, the low level of awareness of the municipality's plans for the Central Innovation District (19%) shows a significant hurdle will need to be overcome to create commitment amongst the users of the district.

Gap: ambitions versus demand

Apart from the mismatch between demand and supply the questionnaire has revealed, a gap can also be identified between the ambitions of the municipality and the demand of the user-groups in the district. One of these gaps is a demand for **accessibility by car** from SMEs and start-ups in the district. This demand does not match well with the municipality's ambition of creating a district in which the use of cars has been brought down to a minimum. The start-ups and SMEs that were questioned in the survey were mostly located in areas where accessibility by car is high, which shows a match between demand and supply at this point. However, when considering mixing the different sub-groups, this is something to take into account.

Another aspect that is not explicitly mentioned by the municipality is the provision of **public internet connections**. Considering the municipality's ambition of creating 'inviting' environments with mixed user-groups and the level of importance given to publicly accessible internet connections in the area, this can be considered to be a gap.

8.3 Managing ambitions

As has been concluded in the previous section, the Central Innovation District in The Hague does currently not reflect the characteristics of the concept of an innovation district as described in theory. In order for the municipality to achieve its ambitions, it has several options in terms of the type of policy they can adopt. Apart from the more general planning tools as developed by Adams and Tiesdell (2010) (shaping, regulating, stimulating and capacity building), more specific tools can be leveraged to assist in the development of the district. Clark et al. (2016) have developed a framework for this purpose (figure 27), in which different types of roles can be identified for both the public and private sector for different phases of the innovation district.

Clark et al. (2016) provide a number of roles that can be adopted by both public and private institutions for each phase ('Start-up', 'Activation' and 'Maturing'). A key role to be played by the municipality in the start-up phase is the role of a leader. A vision will need to be put forward by the municipality, which can be used to connect with the private sector. Other important roles for the public sector lie in the creation of a long-term strategy for the city, site-selection and preparation and the spotting of emerging locations. Moreover, a thorough asset audit is needed to discover the main strengths of the district in terms of both research disciplines and economic sectors.

After the start-up phase, other roles come into play. From the perspective of the municipality, roles in this phase include investing in infrastructure, determining development rights and facilitating mixed use and placemaking in the district. If the start-up phase has been executed well, engagement of the private sector will have been established at this point. In this 'activation phase', partnerships can be formed between investors, operators and innovators and an anchor tenant can be identified that could potentially relocate to the district. Finally, in the 'maturing' phase, both public and private sector institutions can adopt new roles that will assist the development of the district even further.

In The Hague, the phase of activation has not yet been reached. From the analysis in the previous chapters, it has been concluded that the district in The Hague is in an early phase (start-up phase). The vision for the district is currently still under construction and the other roles are also being developed. A key aspect of the role of the municipality of The Hague will be to find a balance between its role as a leader and creating commitment and activating the private sector. Another group of important actors in this process is the group of universities in the district. Although not mentioned in figure 27, universities are a key actor in the development of the triple helix system. A thoroughly executed audit of the district's main assets can further provide the municipality with a clear insight into the strengths and distinctive factors of the district compared to other districts both nationally and internationally. What is more, the analysis of potential sites for development and emerging locations can help to identity strategic locations for development. The Binckhorst area is a clear example of such an emerging location, with a high potential of development, also recognized by the municipality of The Hague (Gemeente Den Haag, 2016).

One of the potential roles of the public sector in the 'Maturing phase', as described by Clark et al. (2016), is about education and inclusion. In The Hague, a city with a strong economic and educational division amongst its inhabitants, it will be key to make this aspect part of the development of the district from an early stage on.

After a clear (shared) vision has been established for the district and key stakeholders have been activated and show commitment for the plans, the municipality of The Hague can consider adopting roles that correspond with the 'activation phase' (e.g. investment in infrastructure and the facilitating mixed use and place-making). Here, physical interventions start to take place that will visibly develop the district.

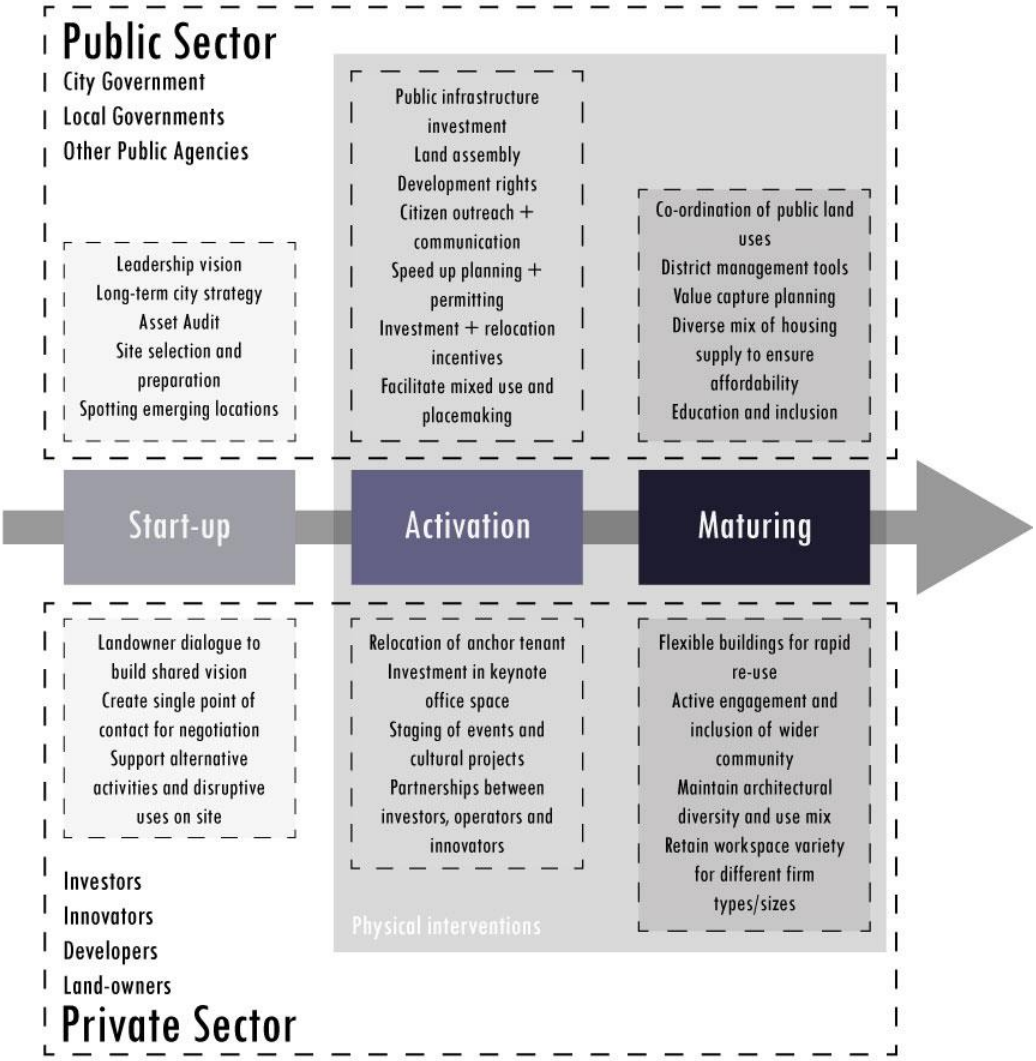


Figure 27. Roles of public sector and private sector actors in different stages of innovation district development. Based on Clark et al. (2016).

PART IV

Conclusions

9. Conclusions

This chapter provides the conclusions of this research. The main research question throughout this thesis has been the following:

"What kind of physical interventions are needed in innovation districts to stimulate the process of innovation of its users?"

This question has been attempted to be answered by performing a literature review, a case analysis of an existing innovation district (22@Barcelona) and a case analysis of an innovation district in an early phase (Central Innovation District The Hague). The results of these different types of research have led to the identification of several physical elements that can support the development of an innovation district. Combining the results of the 22@Barcelona case analysis, the literature review and the empirical research performed in The Hague, the main research question has been attempted to be answered.

The following section will elaborate on the most important findings of this research. In doing so, it attempts to answer the main research question.

9.1 Key Findings

1. Leadership

Throughout this research, it has become apparent that municipal leadership is particularly important in the initial phases of a (top-down led) innovation district. Both the 22@ district in Barcelona and the Central Innovation District in The Hague are examples of districts where an ambition from the municipality has initiated a transformation. Where bottom-up developments are usually led by the users of a district, the top-down character of the districts in Barcelona and The Hague show a stronger need for the creation of commitment for the plans of the governmental body (the municipality).

In the case of Barcelona, a clear leading role can be observed from the side of the municipality in the early stages of the transformation of the district. Here, setting up a specific governmental body, construction incentives and a focus on economic clusters have been examples of governmental interventions aimed to kick-start development in the area. What is more, the municipality of Barcelona has been involved in the creation of a network for the district: the 22@Network. The development of this network, a collaboration between the municipality and important stakeholders in the district, has been an important tool in raising commitment for the development of the district. After this network had been set up, commitment had been created and physical interventions had been done, users of the district participated on a voluntary basis in the 22@Network and the municipality was able to adopt a more facilitating role.

In the Central Innovation District in The Hague, another example of a top-down led transformation, this is also apparent. The plan of transforming the area in between the three main train stations into an innovation district is the result of a municipal ambition, not necessarily the ambition of the users of the district. Considering the early phase the district in The Hague is in, a network of the likes of the 22@Network in Barcelona is not yet realised. However, conclusions can be drawn regarding the primary attempts of the municipality of The Hague regarding the development of such a network. The main observation in this regard is the low level of commitment currently apparent amongst stakeholders in the district. Interviews have revealed that stakeholders in the Central Innovation District generally have a wait-and-see attitude and leave it to the municipality to take initiative. Although several educational institutions (University of Leiden, The Hague University of Applied Sciences) are currently involved in setting up a community of knowledge/practice, a more diverse

network with different types of stakeholders proves difficult to develop. The main problem here is the lack of both an acknowledgement for the potential value of an innovation district in The Hague and a willingness to invest (both time and money) amongst the users of the district. Moreover, interviews (and observations) have revealed that there appears to be a somewhat condemnatory attitude towards the municipality of The Hague and its willingness to intervene/steer. The general conception here is that users of the district should be allowed to have more freedom to arrange things themselves and that the municipality is considered to be rather slow, in the sense that the development of plans for specific areas or policies take too much time before they are being put into practice. The community in the Binckhorst area confirms this; they say the municipality takes too much time in setting up a plan for the area while developers and entrepreneurs are ready to start working there.

To quote Adams and Tiesdell (2010) in their plea for a place-making oriented approach to urban area development: "Without a support coalition, the project may fall victim to its critics". This is particularly apparent in The Hague, where a support coalition is yet to be formed. Adams and Tiesdell (2010) further argue that the place promotor (in this case, the municipality of The Hague) is required to "champion and engender an explicit culture of place-making which turns what might otherwise be a series of separate development project into somewhere distinctive that works successfully as a whole". In the creation of an innovation district, with its particular vision (that of stimulating innovation), the creation of such a cohesion is evidently important.

What is more, as has been elaborated on in chapter 8, not only the public sector but also the private sector has an important role to play in the development of the district (Clark et al., 2016). Without the creation of a support coalition, the roles of the private sector will remain unfulfilled and the district will not be able to reach its full potential.

With the preceding observations in mind, the following statement can be made:

"Leadership of the municipality is key in the early stages of a top-down initiated innovation district"

2. More than sheer accessibility

Globally, a trend has been observed in which not only people but also firms are drawn back to cities. This research has, primarily, confirmed that this is indeed apparent as the municipality of The Hague has (similar to other cities worldwide) adopted the concept of an innovation district to support innovation within its borders and to further develop into a globally competing city.

More specifically, this research has confirmed that there is indeed a need for districts that resemble highly urban environments. Walkability, bike-ability, public transport and a number of amenities (characteristics of urban settings) have been considered to be important by the user groups in the district. This change has been observed and elaborated upon by several authors (e.g. Clark et al., 2010 Katz & Wagner, 2014 and Morrison, 2015) and can be regarded as a movement from 'Silicon Valleys' (San Francisco) to 'Silicon Alleys' (New York).

Jacobs (1961) explained how cities function as 'open systems' to attract talented people from various backgrounds and stimulate their creative capacities. Furthermore, she argued that open and diverse cities attract more talented people, thus spur creativity and innovation, which are the underlying forces of entrepreneurship (Jacobs, 1961). Katz and Wagner (2014) further argued that innovation districts are centrally located areas and are "physically compact and transit-accessible". It appears that this is also apparent in The Hague, in the sense that conditions such as accessibility by public transport, walkability and bike-ability are considered to be important by all user groups within the innovation district.

What is more, students, university staff and SMEs all consider the presence of amenities such as retail, parks and (particularly) hospitality services to be important. This indicates that there is a need for more than just office space and high levels of accessibility. Instead, firms and institutions appear to be looking for an environment that offers other types of activities and places than just work. The importance of such places has been elaborated on in the theory regarding 'third places' (e.g. Oldenburg, 1989; Jeffres et al., 2009 and Mehta & Bosson, 2010) wherein 'home' and 'work' are considered to be respectively place number one and two. In the case of The Hague, the creation of places with a mixture of functions and amenities is also regarded as one of the main aspects of the strategy of the municipality for the development of the district.

Another observation has been made regarding the level of importance given to aspects in the category of image, especially by start-ups. To start-ups, the brand and the uniqueness of the identity of the area are particularly important. Creating a 'start-up climate', therefore, not only requires the aspects mentioned here above, but also a strong brand and a unique identity.

The main conclusion that can be drawn from this is that innovation districts are more than just particularly well-accessible locations. Rather, they are environments that also offer high levels of both walkability and bike-ability, a variety of amenities, a strong brand and a unique identity to satisfy its users. The following statement can be distilled from this:

"Innovation districts offer more than just high levels of accessibility; they offer walkable, bike-able environments with a variety of amenities and a unique brand"

3. Proximity and learning

As Boschma (2005) already established, "geographical proximity is neither a necessary nor a sufficient condition for learning to take place". Moreover, he has distinguished between five distinctive dimensions of proximity (cognitive-, organisational-, social-, institutional- and geographical proximity) and considers the advantage for learning of geographical proximity to be that it "enhances interactive learning by stimulating other forms of proximity" (Boschma, 2005).

With this in mind, the empirical results have been analysed. The most important finding here is that, in the case of The Hague, proximity of SMEs and start-ups does not necessarily produce high levels of collaboration nor learning. In the New World Campus, this is particularly apparent. According to community members, collaboration and learning from other firms within the building is minimal. The main reasons for this appear to be a lack of acknowledgement of the potential value of collaboration between firms and the lack of overlap between the types of businesses. Boschma (2005) argued that, in order for interactive learning to take place between firms, it is important to adopt an absorptive capacity that is open to new ideas. In the New World Campus, such an absorptive capacity does not appear to have been adopted. The results of the survey further emphasize this, showing a low level of collaboration between start-ups and firms, both within and outside their office location. One of the community members in the building put it as follows: "We need common ground to collaborate".

These findings can be placed into the context of an ongoing discussion regarding the benefits of physical co-location of firms and institutions. As Frenken et al. (2007) have argued, the debate about specialization versus diversity is not appropriate and the focus should rather be on the concept of related variety. An analysis of the different economic sectors represented in each of the buildings that offer office space to SMEs and start-ups has revealed that there is no specific economic focus present in nearly none of them (see appendix). Although the New World Campus focuses on businesses that attempt to create a social impact and a better world and therefore shows a particular type of 'common ground', the businesses located here still appear to be too diverse to learn from one another. Two clusters that do show potential in terms of related variety are The Hague Tech and The Hague Security

Delta, where respectively start-ups and firms operating in the tech-business and the (cyber)security business are located.

In Barcelona, the economic clusters formed in the 22@ district are each set up by using the 'triple helix'-model. This means that each cluster is represented by at least one university, a leading private company and a number of entities from the Barcelona City Hall. This ensures learning can take place from different types of institutions (public, private and educational) and human capital can be leveraged between them. In The Hague, such clusters have yet to be formed and the triple helix model is therefore not yet apparent. It is therefore important to consider not only the physical conditions an innovation district can provide, but also the innovation eco-system that hovers above it. As explained by Clark et al. (2016), an eco-system includes "the immediate customer communities, infrastructures, supply chains, labour markets and investment systems that operate at wider metropolitan and regional scales". A district is then the place where the processes of enterprise formation and business growth occur that have been enabled by the eco-system.

The information above reveals an importance for not only creating the physical conditions for an innovation district, but also the creation of an eco-system that is located in such a district. From this, in line with the first conclusion, it can be concluded that physical conditions alone are not sufficient for innovation to take place and that proximity of firms and institutions does not guarantee learning. Taking this into account, the following statements can be formulated:

"Physical conditions alone are not sufficient for innovation to take place"

"Proximity does not guarantee learning: there is a need for common ground"

4. Mixing user groups

As previously explained, innovation districts are based on the concept of the triple helix. Therefore, they are environments in which not only firms (market sector) have a physical presence, but also governmental bodies and universities. The survey has revealed that the different user groups in the district in The Hague have different needs. Although several aspects are considered to be important by all user groups (accessibility by public transport, walkability, bike-ability, hospitality services) some aspects show strong differences in the levels of importance given to them by the different user groups. An example of this is the importance given to affordability of office space and accessibility by car by start-ups in the district. What is more, they find the image of the area to be particularly important. Students and university staff show a lower level of importance for image and are more concerned about the presence of flexible workplaces and public internet connections.

This dispersion in the demand of the user groups is also apparent in the geographical location of the individual user groups in the Central Innovation District. While universities are located in the areas around the Central Station and Laakhaven Hollands Spoor, SMEs and start-ups are predominantly located in the Binckhorst area and the New World Campus. Taking into account the above mentioned individual needs of the user groups, this can be explained. Universities are located next to large public transport hubs, while SMEs and start-ups are located where office space is relatively cheap (DTZ Zadelhoff, 2016) and accessibility by car is high (see results questionnaire).

The above brings forth an issue regarding the idea of mixing user-groups together within the same district. Within the context of creating commitment amongst the users of the district, it will be important to make user groups feel represented in and by the district. Therefore, innovation districts should not solely reflect the needs of students and university staff, but also those of SMEs and start-ups and other user groups in the district. As Morrisson (2015) already stated: "It is because innovation

districts cater to people with ideas and help them generate new ideas that they are so important in the knowledge economy". With this in mind, the following statement can be put forth:

"If innovation districts do not represent the individual needs of its users, user groups may become dispersed and the benefits of geographical proximity could decrease"

5. Brand versus physical environment

According to place-branding theory, successful brands are those that have a connection between the brand and the physical/economic environment (e.g. Vanolo, 2008; Turok, 2009; Hospers, 2011 and Goess et al., 2016). In other words, successful brands have proof that what they claim to be is actually true. Otherwise, a sense of credibility is lost and the brand loses its value. Innovation districts, therefore, should be able to back up their claim of being an environment where innovation is highly present by having proof of this in both an economic and a physical sense.

In practice, this is not always the case. In Barcelona, several economic clusters were formed after a thorough analysis of the city's (then) main economic sectors and potential growth sectors. Hereafter, geographical clusters were formed in the 22@ district where these economic clusters were located. The name, 22@Barcelona, was already adopted before the area showed the characteristics of an innovation district and was rather used as a vision to strive for.

A similar approach can be observed in The Hague. Here, the innovation district was formed after the realisation that the city contained three 'campuses' around the three main train stations. This realisation, in combination with the city's notion of being a city that is undergoing a transition (Gemeente Den Haag, 2016) and an awareness of the potential of innovation districts worldwide has led to the development of the district into an innovation district. The results of the questionnaire, however, have shown that most of the physical conditions of an innovation district are currently not present in the district.

What is more, this research has added to the notion that 'innovation' can be considered to be an ambiguous concept. As Curvelo Magdaniel (2016) already observed, innovation does not have a single definition and is perceived differently in different research disciplines and between market actors. In The Hague, this is also apparent. The empirical analysis has shown that, within the municipality of The Hague, different perceptions exist of the concept of 'innovation'. Not only is this apparent in people's general perception of 'innovation', but also in relation to the innovation district in The Hague. In Barcelona, the municipality adopted the European Commission's definition of innovation[7]. Although this definition offers some degree of clarity, it still perceives innovation as a rather broad concept. This issue has been addressed by Godin (2014), where he explained that the lack of conceptual clarity of innovation has become so marked that it can be defined as a slogan. What can be deducted from these observations, is that the brand of an 'innovation district' is being used as a (flexible) model to strive for rather than a strict demarcation of what the district is. Cities that have the ambition of creating an innovation district do so in order to be able to cope with the contemporary increasing globalization and urban competitiveness. Adopting such a model allows them to grow and become more resilient to future changes. Taking these observations into account, the following statement can be formulated:

"The brand "innovation district" is being used by cities as a (flexible) model to strive for in order to be able to increase cities' levels of urban competitiveness and become more resilient"

[7] "The commercially successful exploitation of new technologies, ideas or methods through the introduction of new products or processes, or through the improvement of existing ones; innovation is a result of an interactive learning process that involves often several actors from inside and outside the companies" (European Commission, 1996).

"What kind of physical interventions are needed in innovation districts to stimulate the process of innovation of its users?"

What this thesis has primarily revealed, is that physical interventions alone are not enough to stimulate the process of innovation of firms and institutions located in an innovation district. The mere co-location of firms and institutions does not necessarily increase the level of innovation within a district. Hovering above the physical district, a strong network between government, market actors and educational institutions is needed. Ultimately, it is this network that will bring forth the high levels of innovation that municipalities strive for.

To create such a network, it is key for the concerning municipality to show leadership in order to be able to create commitment and make users of the district recognize the potential value of the innovation district. Once such a commitment has been established, physical interventions can be made to further develop the district into a mature innovation district. Those interventions range from relatively low-cost interventions (e.g. placemaking), to large investments (e.g. infrastructure).

With this in mind, conclusions have also been drawn regarding the physical facets of innovation districts. What has become ever more apparent in this research, is the complex relationship between the built environment and innovation. As already revealed by Curvelo Magdaniel (2016), the built environment can adopt a facilitating role and work as a catalyst for the process of innovation. Building on this knowledge, the results of this research have shown that there is no clear-cut solution for innovation districts in terms of the physical interventions that have to be made in order to stimulate the process of innovation within a particular geographic area. Such physical interventions depend on the physical state of each innovation district (and the sub-area within them), as this reveals what the main (physical) strengths and weaknesses are.

What this research has revealed, however, is that there are a number of physical interventions that have been proven to be important in both the case of the 22@ district in Barcelona and the Central Innovation District in The Hague. In both cases, particular importance goes out to aspects related to infrastructure. Especially accessibility by public transport (both within the city and in the greater metropolitan area) appears to be of the utmost importance. Other important aspects in the category of infrastructure appear to be the level of bike-ability and walkability the area possesses. What is more, this research has also indicated that other types of aspects are considered to be important in innovation districts. Where the 22@ district has shown a strong focus on the creation of amenities for both public and private purposes, the user groups in The Hague show a strong need for hospitality services.

However, not all aspects show such levels of importance for all user groups. While start-ups in the area have indicated a strong importance for the brand and uniqueness of the identity of the area (image), students and university staff do not find these aspects to be particularly important. It indicates a need for caution regarding the generalisation of the importance of specific aspects of innovation districts. Therefore, in order to be able to stimulate the process of innovation within an innovation district, it is important to acknowledge the different needs of the user groups within the district and find a balance in the (physical) supply that will create a mix of different types of users. When focusing on innovation as the main goal for a district, the physical environment should be supporting this. Innovation is a process that differs strongly per economic sector and firm size, which makes it even more important to consider the individual needs of the users of the district. This means that the built environment should reflect the individual needs that its users have which allow them to be able to innovate. The built environment, in that sense, should be a physical representation of the pathways of innovation of its individual users.

9.2 Implications & recommendations for policy and practice

From the conclusions that have been formulated in the precious section, several implications and recommendations for policy and practice can be formulated. The following sections will relate the conclusions drawn in this thesis to the Central Innovation District in The Hague and attempts to provide useful recommendations for the development of the district.

Pathways of innovation

As elaborated on in the previous section, discussions concerning innovation districts regularly revolve around the creation of a 'buzz' out of which innovation flows. The real pathways of innovation, however, appear to be relatively underexposed in such discussions. Arora et al. (2016) have investigated such pathways for firms in the US and conclude that the sources for innovation are mostly external. What is more, the main channel through which innovation is acquired appears to be cooperative research ventures with other firms, labs or universities[8]. As explained by Andes (2016), the sources of innovation and the channels through which it is acquired vary significantly per industry. Therefore, it will be important to (depending on the main economic focal point(s) of the innovation district) identify the main channels and actors through which innovation is acquired and adjust policy accordingly. Otherwise, innovation districts run the risk of following the path of projects of the likes of the Downtown Project in Las Vegas[9], where a 350 million dollar investment has not (yet) been able to create a successful innovation district.

Place-based approach

One of the conclusions of this research is that innovation districts offer more than just high levels of accessibility. Instead, they offer high quality places and environments that are walkable, bike-able and offer a diverse supply of amenities. As mentioned in the previous chapter, what is considered to be the innovation district by the municipality of The Hague is an accumulation of several smaller districts with their own characteristics and economic focus. Moreover, each of these sub-districts has their own urban plan and rules for development, further adding to the division between the districts. The results of the questionnaire further demonstrate this, showing different results for distinctive sub-areas.

As discussed in the literature review, people increasingly prefer to work and live in a vibrant environment. The Placebrand Observer formulates it somewhat differently, yet similar: "So what, you have a university, modern telecoms, grants, skilled labour etc., they are things any place can offer"[10]. It emphasizes the need to create quality environments, rather than just focusing on sheer quantities. The leading urbanist of the innovation district within the municipality of The Hague mentioned that a strategy for the district could be to focus on several distinctive areas within the district where the innovative programme can be enhanced. Potential strategies for improving the public space in these areas can be found in the theory regarding placemaking (e.g. Adams & Tiesdell, 2010). As has been established in chapter 8, an important aspect of the strategy for the early stages of an innovation district is to create commitment and a network for the district (Clark et al., 2016). Relatively low-cost Placemaking tools (such as the 'Lighter, Quicker, Cheaper' method developed by Project for Public Spaces[11]) can help to increase the level of commitment for the district by involving the users in the placemaking process.

[8] Important to mention here is that these observations are based on numbers and therefore do not take into account the value of such innovations.

[9] https://www.cnbc.com/2016/08/09/zappos-ceo-tony-hsieh-what-i-regret-about-pouring-350-million-into-las-vegas.html

[10] http://placebrandobserver.com/talent-attraction-winners-priorities-europe/

[11] https://www.pps.org/reference/lighter-quicker-cheaper/

"You should focus on several strategic places within the district where the innovative programme can be enhanced" – Eit Hasker, leading urbanist CID

It is then key to identify places where such tools can be put to use. Figure 28 provides an overview of the main economic sectors in the area and their location in the district. This map shows how most governmental institutions are located in the northern part of the district, as well as the main educational institutions (Leiden University, Royal Academy of Art, Royal Conservatory, Inholland). The southern part of the district is more characterized by small entrepreneurship in varying economic sectors. In the western part of the district (marked here as sub-area 5), a cluster of firms in the (cyber)security and IT/telecom sectors can be recognized, marking an interesting place for an enhancement of the innovative programme.

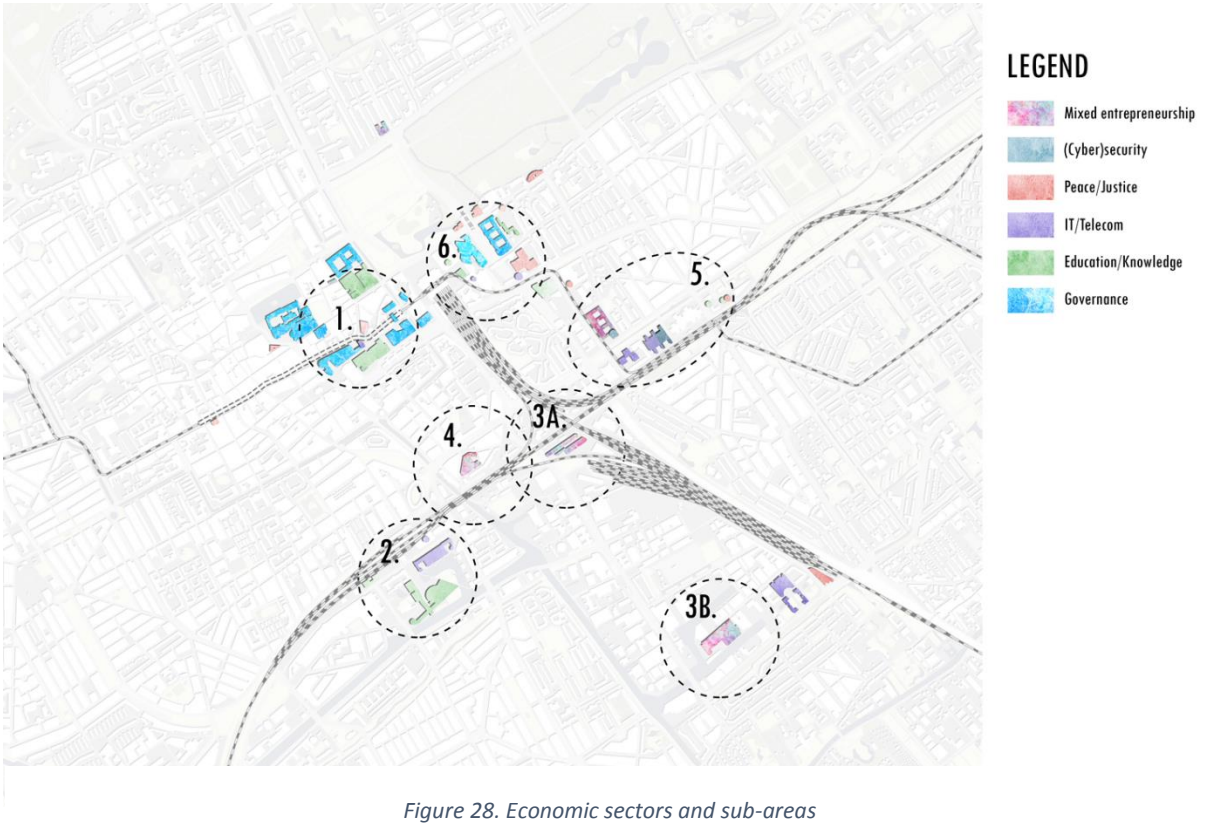


Figure 28. Economic sectors and sub-areas

Potentially strategic areas for intensifying the innovative programme and activity are *Laakhaven Hollands Spoor* (sub-area 2) and *Laan van NOI North* (sub-area 5). Each of these areas is located next to a main train station, connecting the areas to large cities such as Amsterdam and Rotterdam. Moreover, each of these areas contains significant educational institutions or firms. *Laakhaven Hollands Spoor* has the advantage of the presence of the The Hague University of Applied Sciences which is the source of a great number of students in the area. Moreover, telecom firm T-Mobile has its headquarters located here and IT firm Q42 has set up one of its three offices here. The main weaknesses of the area are the amount of *parks*, *places to study* outside of the faculty building*, housing for students* and the *connection with its environment*. *Laan van NOI North* scores relatively high in the category of infrastructure, but shows relatively less positive results in the other categories. Considering its location next to infrastructural hub Laan van NOI and the presence of several important firms and institutions (mainly in the IT/Telecom and Cybersecurity sector), this area can be considered to have a large amount of potential for intensification in terms of activity and diversity.

Clear vision

As can be seen in the analysis of the 22@ district, the city of Barcelona has chosen several economic sectors to focus on with their innovation district. This strategy of clustering like-minded firms and institutions is also mentioned in literature (e.g. Frenken et al., 2007; Katz & Wagner, 2017). As stated by Katz & Wagner (2017), cities should perform a thorough analysis of their main economic and research strengths and clusters in order to come to discover where a possible innovation district could take form. In The Hague, the innovation district was announced before performing such a detailed analysis, which makes it difficult to pinpoint the specific strengths of the district at this point. However, it is clear that the area houses a number of economic clusters of firms and institutions. Therefore, performing a detailed analysis of the economic strengths as well as the strengths in research the city possesses could further help the city of The Hague to position its innovation district in a global context and strengthen its distinctive capabilities.

Urban lab

One of the main elements of the storyline of the metropolitan region of Rotterdam and The Hague (MRDH) is that the region should be a 'real life testing ground' for metropolitan regions worldwide (Innovation Quarter, 2017). Moreover, the MRDH region states that "innovations for maintaining a liveable urban delta are invented, made, tested and sold here" (Innovation Quarter, 2017). However, the question arises here to what extent this is actually being executed and displayed in the public space of the MRDH region, or more specifically, in the city of The Hague. As discussed in chapter 5, the 22@ district in Barcelona is an example of an area where the municipality has offered its public space as an urban lab for innovations that could potentially serve both public and private interests. In The Hague, the Binckhorst Festival is an example of a yearly event that explicitly shows the work being done in the Bicnkhorst district. This festival can be seen as a form of an urban lab, in which public space is leveraged to show the innovative power of the area. Considering The Hague's strength in terms of (cyber)security, such an urban lab could possibly serve to test innovations in this field. The municipality could consider setting up a framework for its own urban lab, allowing private firms and institutions to use the public space as a testing ground under specific conditions.

Branding

As the questionnaire indicates, the level of awareness of the brand "Central Innovation District" is low. Of course, the district is still in an early phase and this result is therefore not surprising. However, considering that the innovation district has been mentioned in several news articles, it does indicate towards a lack of commitment amongst firms and institutions in the district. It will be important for the municipality to create commitment among these firms, as they are ultimately the actors that will carry the brand.

Another important aspect of the district, in terms of the brand, is its name. Currently, the district has been given the name "Central Innovation District". As mentioned before, the district currently does not have an explicit (economic) focus and this is reflected in its name. It must be mentioned here, however, that interviews and attended meetings have indicated that the municipality is also aware of this issue.

PART V

Reflection/Discussion

10. Reflection

During the development of this thesis, several topics of discussion have emerged. Considering the limited timeframe in which this research has been executed, these topics have not been intensively investigated during the research period. However, they do offer interesting insights into the context of this research and each of these topics will therefore be briefly discussed in the following sections. Although the scientific argumentation of some of these topics might be somewhat limited in particular cases, an attempt has been made to include these topics in the reflection of this research to both place this research into context and inspire both researchers and professionals to perhaps delve deeper into these topics.

Inclusion

Especially in The Hague, a city where a strong demographical division is apparent, it is important to consider the topic of inclusion when developing an innovation district. Inherent to innovation districts are increased levels of quality of life and activity in public space, which in turn increase the potential of gentrification. Gentrification, described by Ley (2003) as "the transition of inner-city neighbourhoods from a status of relative poverty and limited property investment to a state of commodification and reinvestment", is one of the potential side-effects of creating an innovation district. Coffee shops, hip restaurants and international population are aspects seen worldwide in transforming/gentrifying neighbourhoods.

In the Central Innovation District, which contains over 10.000 social housing units, it is therefore important to take this into account when developing a strategy for the transformation of the district. As Morrisson (2015) already stated, it is important to design innovation districts with the goal of being as inclusive as possible in order to avoid the risk of public resistance. An example of such an 'inclusive' strategy can be seen in Barcelona, where one of the leading aspects of the vision for the transformation of the area has been to include the local population and make sure public and private benefits are balanced.

Serendipity

As elaborated on in this research, physical proximity is not a sufficient condition for learning to take place. The topic of 'related variety' (Frenken et al., 2007) appears to be an important facet of this discussion. As Olma (2016) states, serendipity is not only about unexpected encounters, but also (and possibly even more so) about the capacity to recognize the value of an encounter. Without this capacity, a potential opportunity might go unnoticed due to the ignorance regarding a specific field of knowledge.

The role of the built environment in this can be considered to be a facilitating one, in which the conditions for unexpected encounters are created. High mixtures of functions, population groups and inviting public spaces all contribute to raising the odds of having unexpected encounters. However, these encounters remain relatively meaningless without a potential spin-off of such encounters. Next to the creation of a 'serendipitous environment', it will therefore be important to consider the characteristics of the user groups and attempt to create an environment where learning can take place.

Innovation districts versus 'normal', highly urban districts

Looking at the physical characteristics of innovation districts, one can come to the conclusion that these districts do not differ particularly from 'normal' urban environments. The main line of thought this thesis has attempted to convey, is that this difference is indeed minimal and that innovation increasingly appears to take place in environments that are appreciated for the same reasons that people move to cities: high quality of life, high diversity of amenities, potential partners, and so on. Although some aspects in this research can be linked more specifically to innovation (e.g. spaces for

events, affordable office space) others simply have to do with increasing activity in public spaces and quality of life (e.g. parks, walkable environments).

Designing innovation

Another topic of discussion revolves around the degree to which innovation can actually be 'designed'. The true pathways of how innovation comes to be are hard to grasp and attempting to design this seems similar to how overthinking kills spontaneity. What seems to be the most important aspect of 'designing' an innovation district, is learning *what* to design and (perhaps more importantly) what *not* to design. It appears that firms and institutions value a particular sense of freedom, while at the same time they consider it to be important to be located in an environment where activity in public spaces is high and unexpected encounters are a common occurrence. In creating such an environment lies an obvious role for the municipality. However, it appears to be equally important to consider the needs of the users of the district and figure out what *not* to design.

Chicken-and-egg dilemma

A recurring topic of discussion in the debate around innovation districts is the order of steps that need to be taken in order to successfully develop the district. The main question here, is whether firms and institutions follow after physical interventions have been made, or whether a vision and commitment are primarily important and interventions in the built environment can be made hereafter. This research has attempted to argue that, although the role of the physical environment is significant in the development of an innovation district, it is primarily important to create a clear vision and commitment, particularly in the initial phases of the district. The Downtown Project in Las Vegas can again be used as an example here, as the lack of a clear vision and commitment have stalled the district's development while a lack of investment was certainly not an issue ($350 Million USD).

This chicken-and-egg dilemma is one of the most challenging issues in the theory regarding innovation districts and this research does not claim to have the solution. However, experience does show that successful innovation districts are those that are able to convey a strong sense of commitment amongst its users and that have a clear vision regarding the capacities of the district.

11. Discussion

This chapter will conclude the thesis by presenting a discussion regarding distinctive parts of the research. First, the limitations of this research will be discussed for each individual part of the thesis. Then, both the scientific and societal relevance of this research will be discussed. Finally, this thesis will conclude with several recommendations for future research.

11.1 Limitations of this research

11.1.1 Questionnaire

This research does not attempt to generalize the results of the questionnaire for the total population of the district. Therefore, sub-groups have been identified for which the results can be generalized with a higher level of certainty. However, this level of certainty can still not be seen as 100 percent, making it important to discuss some issues related to the generalization of the results of this research.

As Bryman (2012) indicates, “the less sampling error one is prepared to tolerate, the larger a sample will need to be”. In order to come to reasonable levels of representability, this research has attempted to receive respondents for the questionnaire in different ways and by using different types of approaches. Students, for instance, have been approached through both Facebook groups, e-mails and physical questionnaires (in-person). This raises questions to whether the results of the students can be generalized to the total amount of students in the area. For instance, the students that have been questioned at the Wijnhaven building of the University of Leiden were all there to study. This means that the students that have been questioned at this location, were all students who chose to study at the faculty that day. Students that did not go to the faculty to study, where not questioned by using a physical form and were therefore not heard. The same goes for Facebook groups. The respondents were all students who are active on Facebook, students who do not have a Facebook account were therefore not heard. However, combining both e-mail, Facebook and physical responses, the level of representability might be considered to be somewhat higher.

Apart from the issue of representability in terms of the type of respondent, the sheer amount of respondents is also an important issue. In the Binckhorst area, for example, a total amount of 26 firms of the Bink36 building has responded. Comparing this to the total amount of firms in the area, this number might not be particularly high. However, when compared to the total amount of firms in the building, (+- 300), this adds up to nearly 10% of the total amount of firms in that particular area. The conclusions of the sub-areas should therefore be seen in the context of the respondents and one should be careful in the generalization of these results to a larger area.

This is especially true for the results of the sub-areas where a relatively low amount of respondents has been gathered. Sub-area 4 and 5 respectively have seven and eight respondents, making it difficult to generalize the results of these respondents to the total population of these sub-areas. However, considering that some aspects show a clear direction for specific aspects in the area, some conclusions can still be attempted to be drawn.

11.1.2 Single case study

There appears to be much discussion concerning the use of a single case-study and the contribution it makes to the scientific world. Especially the level of generalization appears to be an issue. Some say that a single case study cannot provide reliable information about the broader class, but it may be useful in the preliminary stages of an investigation since it provides hypotheses, which may be tested systematically with a larger number of cases (Abercrombie et al., 1984). Moreover, Kuhn (1987) has argued that a discipline without a large number of thoroughly executed case studies is a discipline without systematic production of exemplars, and that a discipline without exemplars is an ineffective one.

Flyvbjerg (2006) has a contrary view on the matter and argues that a greater number of good case studies can also contribute to scientific research. He further goes on to argue that "predictive theories and universals cannot be found in the study of human affairs. Concrete, context-dependent knowledge is, therefore, more valuable than the vain search for predictive theories and universals" (Flyvbjerg, 2006). This research has attempted to follow this line of thought and contribute to scientific research by doing a quality analysis of a single case. Therefore, this research does not attempt to generalize the results of this research to the total amount of innovation districts worldwide. It rather attempts to add to the scientific knowledge regarding specific, context-based situations. In this case that context is the city of The Hague.

11.1.3 Quantity versus Quality

The results of the questionnaire indicate whether the quantity of certain aspects in the district are sufficiently present or not. However, it might be equally important to determine whether the *quality* of specific places are line with the demand of its users. This research does not attempt to claim that solely improving the quantities of the aspects mentioned in this research create places that better fit the demand of the users. A balance between quantity and quality could be needed.

11.2 Research relevance

11.2.1 Scientific relevance

This research has aimed to contribute to research on the link between innovation and the built environment. It specifically focused on the physical interventions that can be done in innovation districts in order to stimulate the process of innovation by innovative entities. The empirical analysis aims to contribute to research on how steering actors can stimulate innovative entities that are located in innovation districts. The final result of this research could prove useful for researchers that are conducting research on the link between innovation and the built environment, as well as researchers/professionals interested in the development of innovation districts.

11.2.2 Societal relevance

This research has aimed to produce an outcome that will provide a better understanding of how to translate an ambition for creating an innovation district into corresponding physical interventions. This will help create a link between the brand 'Innovation District' and the actual built environment, and aims to contribute to higher levels of innovation within the district. The empirical analysis on the preferences of the end-user provide municipalities with a better understanding of how to create an environment that matches the preferences of the users of innovation districts. In the long run, this could improve the competitiveness of the city in which the case is located and help stimulate its economy. Considering the high levels of infrastructural as well as institutional connections between cities within the Randstad, this could potentially prove beneficial for the development for the Randstad as a whole.

11.3 Recommendations for further research

This research does not claim to be an exhaustive research on the case of the innovation district in The Hague. During the process of this research, several topics have arisen which, due to time constraints, have not been studied in this research. This section will elaborate on these options for further research.

One of the obvious options for further research is the organizational aspect of the innovation district. This research has mostly focused on the physical aspects of the district and has therefore left the organizational aspects mostly out of consideration. However, in the process of this research, the importance of the organizational aspects have only been emphasized. It would therefore be an interesting topic of further research to explore the possibilities of creating a strong network within an innovation district.

Another option for further research could be to delve deeper into the economic challenges that are related to the development of innovation districts. Although this research has attempted to draw links with economic theory, this facet has been somewhat underexposed. Deeper understandings of the benefits of clustering and the innovation processes related to different economic sectors could prove beneficial to improving the overall strategy of developing an innovation district.

Considering the managerial focus of this thesis, a potential option for future research lies in the architectural/urban design aspects of innovation districts. A vast amount of literature suggests that public spaces and buildings in innovation districts should be 'inviting' and should stimulate serendipity. A thorough analysis of the elements related to architecture and urban design that constitute successful innovation districts could prove helpful in the search for how innovation districts can be shaped. Especially a linkage with the innovation pathways of firms and institutions could potentially result in interesting design principles for the built environment of innovation districts.

Finally, a possibility could be to increase the amount of respondents for the survey. Although the amount of students, university staff and SMEs show significant numbers of respondents, the amount of respondents for the group of start-ups and international firms is considerably lower. Future research could focus on these groups in the district to create a better image of the demand of these groups.

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Appendix

Table A1. Results Questionnaire Level of importance (Students)

Type Responde	Div. Infrastructure	Walkability	Bike-ability	Acc. Car	Acc. PT	Acc. GM by F	Shared space	Shared Facilitie	Event Spaces	Flexible workplaces	Parks	Squares	Div. Inh.	Retail	Horeca	Internet	Q. Mat.	Mod. Mat.	Flex. Space	Publicity	Uniqueness	Brand	Awareness
Student	4	4	4	3	4	5	4	4	4	4	5	5	3	4	4	4	4	4	4	3	4	4	0
Student	3	4	3	3	4	4	3	3	2	2	3	3	4	4	4	4	4	4	2	3	3	3	0
Student	4	3	4	3	4	4	4	4	4	4	3	3	4	3	3	4	4	3	4	4	3	2	0
Student	4	4	4	3	4	4	4	4	4	5	4	4	5	5	5	5	5	5	5	4	3	2	0
Student	4	4	4	4	5	5	4	3	3	4	3	3	4	3	4	5	4	4	4	3	3	3	0
Student	5	5	5	2	5	5	5	4	3	5	3	3	3	2	4	4	3	4	4	3	4	4	0
Student	3	4	5	3	5	4	3	3	3	4	3	4		4	4	4	5	5	5	3	5	3	0
Student	4	4	4	3	5	4	4	4	4	4	3	3	3	4	4	5	4	4	4	4	4	4	0
Student	4	5	4	3	4	5	4	5	3	4	4	4	3	5	5	5	4	5	5	4	5	3	0
Student	5	4	4	2	4	4	3	4	3	4	4	3	4	4	4	3	4	5	4	4	4	4	0
Student		4	5	2	5	5	3	3	4	4	4	2	4	4	4	4	4	4	4	4	4	3	0
Student	5	4	4	4	5	5	5	4	3	5	3	3	2	4	3	5	5	5	5	3	3	3	1
Student	4	4	2	5	4	4	3	4	4	5	4	5	3	5	5	5	4	3	4	3	3	3	0
Student	5	4	4	3	5	5	4	3	2	3	2	5	3	3	5	4	3	4	2	2	2	3	0
Student	4	4	5	5	5	5	4	5	4	5	5	4	5	4	5	5							0
Student	5	4	5	2	5	3	4	3	4	4	4	4	3	4	4	5	4	4	4	2	4	3	0
Student	5	5	4	2	4	4	4	3	4	4	5	4	3	4	4	3	4	4	5	3	3	3	0
Student	2	4	4	4	5	5	4	4	4	4	4	4	4	2	5	5	4	2	4	3	3	2	0
Student		4	4	4	5	4	4	4	4	5	5	5	3	3	5	5	4	5	5	4	4	5	0
Student	3	4	4	3	5	5	4	5	1	1	1	1	3	3	5	5	4	4	5	4	4	4	1
Student	4	4	2	2	5	5	2	2	2	4	4	2	2	2	4	5	5	4	5	4	1	1	0
Student	5	4	4	1	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	3	3	3	0
Student	4	4	5	2	5	3	3	4	4	4	5	5	3	5	5	4	4	5	4	4	5	5	0
Student	5	5	5	2	5	4	5	5	4	5	4	4	3	4	4	5	4	3	5	3	4	3	0
Student	4	5	5	4	5	5	4	4	3	5	3	3	3	4	3	5	4	4	5	4	4	2	0
Student	4	4	4	4	5	5	4	4	4	4	4	3	3	4	4	3	4	3	4	3	3	3	0
Student	5	3	3	4	5	5	3	4	3	2	2	2	1	3	5	2	3	3	3	3	3	3	0
Student	5	4	4	3	5	5	4	4	4	2	3	2	3	2	5	5	3	3	2	4	3	2	0
Student	4	5	4	2	2	4	4	2	2	4	2	2	4	4	4	4	4	2	4	2	2	2	0
Student	5	3	4	4	5	2											4	3	4	3	3	2	0
Student	3	4	5	4	5	5	4	3	4	5	3	3	4	3	4	5	4	5	4	3	3	3	1
Student	4	4	4	4	5	5	4	4	4	5	4	2	4	4	5	5	4	5	5	4	4	5	0
Student	5	3	3	5	5	3	4	4	4	4	5	5	5	5	5	5	3	4	4	4	4	4	0
Student	5	3	5	3	4	4	5	4	3	5	5	4	4	4	5	5	4	3	4	2	3	3	0
Student	5	4	5	4	5	4	4	5	3	2	4	2	3	4	2	2	3	4	2	2	2	2	0
Student	5	4	4	2	4	4	3	4	3	4	3	3	5	4	3	5	4	4	4	2	3	2	1
Student	4	3	3	3	5	4	3	3	3	4	3	3	2	4	4	5	4	3	4	3	3	4	0
Student	4	4	3	2	4	4	5	4	4	4	5	4	4	5	4	5	4	4	4	4	4	4	1
Student	5	5	4	5	5	5	4	4	4	4	4	4	4	4	4	5	4	5	4	5	4	5	0
Student	5	4	3	3	5	5	5	5	4	5	3	4	5	4	4	5	4	4	4	4	4	4	0
Student	4	2	3	3	5	5	2	2	4	5	5	5	3	4	2	5	5	5	5	4	4	3	0
Student	3	4	4	1	5	5	4	4	5	3	5	5	4	4	4	4	5	5	4	4	4	4	1
Student	5	4	5	2	5	4	4	3	5	4	4	4	5	5	5	5	4	4	5	4	3	3	0
Student	4	4	4	2	5	3	4	4	2	3	2	2	4	4	3	4	4	4	3	3	3	3	1
Student	4	5	5	2	5	5	4	4	4	5	5	5	5	3	5	5	4	5	5	4	4	1	0
Student	4	3	5	2	5	3	4	4	2	4	3	2	2	4	4	5	4	4	3	2	4	4	0
Student	4	4	5	2	4	5	2	2	2	5	5	4	2	4	5	5	5	5	5	4	4	4	0
Student	4	4	3	3	5	5	4	3	3	5	3	3	4	4	5	5	5	4	5	4	4	3	0
Student	2	4	5	2	4	2	4	2	4	4	4	4	2	4	4	5	2	4	4	2	2	2	0
Student	2	4	4	2	5	4	3	3	3	3	3	3	3	4	3	3	4	4	4	3	3	3	0
Student	4	4	4	2	4	3	4	4	2	3	2	2	2	4	3	3	3	3	3	2	2	2	0
Student	4	5	5	3	5	5	5	5	5	5	5	5	4	4	4	5	5	3	4	3	3	1	0
Student	3	5	4	2	5	5	4	4	3	5	3	2	3	4	4	1	3	2	4	1	1	1	0
Student	4	5	4	2	5	3	4	4	4	5	5	5	4	3	4	5	4	5	5	4	4	3	0
Student	5	5	4	2	5	4	5	5	4	5	5	4	4	3	5	3	5	4	5	4	5	4	0
Student	2	4	5	2	4	5	4	4	2	4	5	4	2	4	5	1	4	3	5	4	3	2	0
Student	4	5	5	3	5	2	3	3	4	3	4	3	4	4	5	5	5	4	3	4	4	4	0
Student	4	5	5	1	3	2	5	3	5	5	5	3	4	2	4	4	4	3	3	2	5	2	0
Student	4	5	5	1	5	5	5	5	2	2	4	4	1	4	4	2	5	5	5	4	4	2	0
Student	3	4	5	3	5	3	4	4	5	5	4	2	3	3	5	2	3	3	5	3	4	2	0
Student	5	4	4	4	5	4	4	4	4	4	2	2	2	4	4	4	4	2	2	2	2	4	0
Student	5	5	5	5	5	5	5	5	1	5	4	3	4	3	4	5	2	3	4	4	4	5	1
Student	4	5	5	2	4	4	5	4	4	5	5	5	4	4	5	5	5	4	4	3	4	3	1
Student	4	5	5	1	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Median	**4**	**4**	**4**	**3**	**5**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**3,5**	**4**	**4**	**5**	**4**	**4**	**4**	**3**	**4**	**3**	**14%**
Q3	5	5	5	4	5	5	4	4	4	5	5	4	4	4	5	5	4	4,5	5	4	4	4	
Q1	4	4	4	2	4	4	4	3	3	4	3	3	3	3	4	4	4	3	4	3	3	2	
Q3-Q1	1	1	1	2	1	1	0	1	1	1	2	1	1	1	1	1	0	1,5	1	1	1	2	

Table A2. Results Questionnaire Level of importance (University Staff)

Type Responde	Div. Infrastructure	Walkability	Bike-ability	Acc. Car	Acc. PT	Acc. GM by F	Shared space	Shared Facilitie	Event Spaces	Flexible workplaces	Parks	Squares	Div. Inh.	Retail	Horeca	Internet	Q. Mat.	Mod. Mat.	Flex. Space	Publicity	Uniqueness	Brand	Awareness
Uni. Staff	3	5	4	3	5	5	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	0
Uni. Staff	4	4	2	4	5	5	5	4	4	4	5	5	4	4	5	5	4	4	4	2	2	2	1
Uni. Staff	4	5	5	2	5	5	4	4	4	2	4	4	4	4	4	4	4	4	3	4	4	2	0
Uni. Staff	4	4	3	2	5	5	3	3	4	3	4	3	4	4	4	4	3	3	4	3	3	3	0
Uni. Staff	3	4	4	4	5	5	4	2	4	2	1	2	1	1	4	2	3	4	4	4	4	4	0
Uni. Staff		5	5	2	4	3	4	3	4	3	5	4	4	4	4	3	4	2	2	3	3	3	0
Uni. Staff	5	5	5	4	4	4	4	3	4	1	4	4	4	4	4	3	4	4	3	3	3	3	1
Uni. Staff	5	5	5	5	5	5	5	1	5	2	5	5	5	3	5	5	4	4	2	2	4	5	0
Uni. Staff	5	4	4	3	5	5	2	2	4	1	4	4	3	4	4	4	5	4	1	3	3	3	0
Uni. Staff		4	5	2	5	5	5	4	5	5	4	5	4	3	5	5	4	5	5	3	5	1	1
Uni. Staff	5	5	5	2	5	5	4	4	4	4	5		4	4	4	4	5	3	3	4	4	1	0
Uni. Staff	3	4	3	2	5	2	3	3	4	2	3	3	3	1	4	3	3	4	4	2	3	3	0
Uni. Staff	4	4	4	4	4	4	4	4	4	3	4	4	4	3	4	4	3	3	4	4	4	4	1
Uni. Staff	4	4	5	4	5	5	3	4	4	2	3	3	4	3	3	3	4	5	4	4	4	4	0
Uni. Staff	4	5	5	4	5	4	4	4	4	2	4	3	4	4	4	4	4	3	4	3	4	2	0
Uni. Staff	3	4	3	3	5	5	4	4	5	2	4	4	3	4	4	3	4	4	3	4	4	4	0
Uni. Staff	4	5	5	3	5	5	4	4	4	4	4	4	5	3	4	5	4	4	4	5	3	4	1
Uni. Staff	4	4	5	1	4	3	5	3	2	4	4	4	4	5	5	4	3	4	4	4	2	2	1
Uni. Staff	4	5	5	3	5	5	4	3	4	4	5	5	5	5	5	5	4	3	5	4	4	3	0
Uni. Staff	3	3	4	3	4	4	3	3	4	3	3	3	3	3	3	3	3	4	4	4	4	3	0
Uni. Staff	4	4	5	4	4	4	4	4	4	4	5	5	4	5	5	5	4	4	4	4	4	4	0
Uni. Staff	4	5	3	2	5	5	3	3	4	2	4	3	3	4	4	4	3	3	3	4	4	4	0
Uni. Staff	2	2	2	5	5	5	5	5	2	2	2	2	4	1	4	4	2	2	5	1	1	1	0
Uni. Staff	2	4	4	1	5	5	2	3	3	3	4	3	2	1	2	2	2	2	4	2	2	2	0
Uni. Staff	4	5	4	4	5	5	3	3	4	2	5	5	4	5	5	4	5	3	3	3	4	4	0
Uni. Staff	4	5	4	2	5	5	2	2	2	3	2	4	4	4	4	4	4	4	3	4	4	4	0
Uni. Staff	2	4	3	2	5	5	4	3	2	1	3	2	2	4	2	4	3	2	3	4	4	3	0
Uni. Staff	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	4	1	4	3	3	3	1
Uni. Staff	4	4	5	2	4		4	5	4	1	3	3	3	5	5	5	3	2	1	4	4		0
Uni. Staff	4	5	5	1	5	5	4	4	4	1	5	4	4	1	5	5	4	5	3	1	3	1	0
Uni. Staff	4	5	5	3	4	4	3	3	4	4	3	3	4	4	4	2	4	3	5	3	2	2	1
Uni. Staff	3	3	3	4	5	5	3	3	4	1	4	4	4	4	4	2	4	4	2	3	3	2	0
Uni. Staff	5	5	5	4	5	5	3	4	4	4	3	3	3	3	4	4	4	5	5	4	4	4	1
Uni. Staff	3	3	5	3	3	3	3	3	3	3	3	3	3	4	4	3	4	4	4	3	3	3	0
Uni. Staff	5	4	4	5	5	5	5	5	3	3	3	4	4	4	3	4	4	4	4	4	3	4	1
Uni. Staff	4	4	5	3	4	5	2	2	4	2	3	3	4	4	4	3	4	4	3	4	4	4	1
Uni. Staff	4	5	4	4	4	4	4	4	3		5		4	3	4	4	5	4	3	4	4	3	1
Uni. Staff	4	4	4	2	4	4	2	2	4	2	4	4	4	4	4	4	4	2	3	4	2	1	0
Uni. Staff	5	5	5	5	5	5	3	3	4	4	4	4	2	4	5	5	3	3	3	4	4	4	0
Uni. Staff	4	4	4	4	4	4	4	3	4	3	4	3	3			2	4	4	3	4	4	4	0
Uni. Staff	3	4	4	3	4	4	4	4	3	4	4	4	4	3	4	3	4	4	4	4	3	3	0
Uni. Staff	4	5	5	2	4	4	4	3	4	2	2	5	4	4	5	2	4	4	5	4	3	4	0
Uni. Staff	4	4	5	1	5	4	5	4	4	3	4	4	4	3	4	3	4	3	5	3	4	2	1
Uni. Staff	4	4	4	4	4	4	4	4	4	4	4	3	5	4	4	5	5	4	3	2	4	1	0
Uni. Staff	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	5	4	4	4	0
Uni. Staff	4	4	4	3	5	5	4	4	3	2	2	2	2	2	3	2	3	4	4	3	3	3	0
Uni. Staff	5	5	5	2	5	5	5	4	5	5	4	4	4	4	5	2	5	3	4	4	4	1	0
Uni. Staff	4	5	3	3	5	5	5	5	5	3	3	3	4	3	4	5	4	5	4	5	5	5	1
Uni. Staff	4	4	3	5	4	5	4	4	4	4	4	4	3	3	4	4	4	3	4	2	2	2	0
Uni. Staff	3	3	4	4	4		4	4	4	4	4	3	3	3	4	2	4	4	4	3	4	2	1
Uni. Staff	5	5	5	5	5	5	5	4	5	4	5	5	3	3	4	3	4	4		5	5	5	0
Uni. Staff	2	4	4	4	5	5	4	4	4	3	4	4	4	4	4	4	4	4	4	3	3	3	0
Uni. Staff	4	4	5	5	5	4	4	3	5	3	4	3	4	3	4	3	4	2	3	4	3	2	0
Uni. Staff	2	4	4	4	5	5	4	4	4	3	4	4	4	4	4	4	4	4	4	3	3	3	0
Uni. Staff	4	4	5	5	5	4	4	3	5	3	4	3	4	3	4	3	4	2	3	4	3	2	0
Uni. Staff	4	4	4	4	4	4	4	4	4	2	4	4	3	3	4	4	4	4	4	4	4	4	0
Uni. Staff	4	5	5	2	4	5	5	5	4	3	4	4	4	4	4	3	3	4	4	4	3	2	0
Median	**4**	**4**	**4**	**3**	**5**	**5**	**4**	**4**	**4**	**3**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**3**	**27%**
Q3	4	5	5	4	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Q1	4	4	4	2	4	4	3	3	4	2	3	3	3	3	4	3	3,5	3	3	3	3	2	
Q3-Q1	0	1	1	2	1	1	1	1	0	2	1	1	1	1	0	1	0,5	1	1	1	1	2	

Table A3. Results Questionnaire Level of importance (SMEs & Start-ups)

Type Responde	Div. Infrastructure	Walkability	Bike-ability	Acc. Car	Acc. PT	Acc. GM by F	Shared space	Shared Facilitie	Event Spaces	Flexible workplaces
SME	5	5	4	1	5	5	3	3	4	3
SME	4	5	5	5	4	3	2	5	4	2
SME	2	3	3	3	4	3	2	2	2	2
SME	4	2	4	4	3	3	3	4	4	4
SME	4	5	4	4	4	5	5	3	2	4
SME	4	5	5	4	5	4	4	4	2	2
SME	4	5	5	5	4	4	2	2	2	4
SME	3	4	5	5	4	4	2	2	2	2
SME	3	4	4	5	5	5	4	4	4	2
SME	4	4	5	5	5	4	4	4	4	3
SME	4	3	4	4	4	3	3	4	4	3
SME	4	4	4	4	4	4	2	2	2	2
SME	1	1	1	1	1	1	1	1	1	1
SME	5	5	4	1	5	5	3	3	4	3
SME	4	5	5	5	5	5	2	2	5	4
SME	3	4	5	5	4	3	2	2	3	2
SME	4	5	5	2	5	5	2	4	4	2
SME	4	3	3	5	4	4	4	5	4	3
SME	5	3	4	5	5	5	3	3	4	2
SME	4	4	4	4	4	3	2	4	3	4
SME	2	4	5	2	5	4	1	1	1	1
SME	3	2	2	5	4	3	3	2	2	3
SME	4	4	4	4	4	3	3	3	2	4
SME	4	4	4	4	4	4	4	3	4	4
SME	4	2	4	4	4	4	4	4	4	4
SME	5	4	5	4	5	5	2	3	4	2
SME	4	4	4	5	5	3	3	3	3	2
SME	5	3	4	5	5	5	4	2	4	1
SME	4	3	4	5	4	4	4	4	4	2
SME	5	2	5	5	5	5	4	4	4	3
SME	4	3	4	4	4	3	5	5	5	5
SME	5	4	5	5	5	5	4	4	4	3
SME	4	5	5	4	5	5	4	4	4	4
SME	3	4	5	4	4	3	2	2	1	2
SME	4	5	5	4	5	5	3	3	3	3
SME	2	4	5	1	4	4	3	3	4	3
SME	5	5	5	5	5	5	3	3	4	2
SME	5	4	5	3	5	5	5	5	4	3
SME	4	2	4	5	4	4	4	4	4	2
SME	3	1	4	5	3	3	5	5	4	3
SME	4	4	4	4	5	4	3	4	4	4
Median	4	4	4	4	4	4	3	3	4	3
Q3 (SMEs)	4	5	5	5	5	5	4	4	4	4
Q1 (SMEs)	3	3	4	4	4	3	3	3	3	2
Q3-Q1 (SMEs)	1	2	1	1	1	2	1	1	1	2

Type Responde	Parks	Squares	Div. Inh.	Retail	Horeca	Internet	Q. Mat.	Mod. Mat.	Flex. Space	Publicity	Uniqueness	Brand	Awareness
SME	5	5	4	2	5	3	4	5	3	4	5	3	1
SME	4	4	4	3	4	4	4	4	3	4	4	4	0
SME	4	3	3	4	4	3	4	3	4	4	4	4	0
SME	4	3	3	4	4	3	4	5	4	3	4	2	0
SME	5	4	3	5	4	1	5	1	4	4	3	4	0
SME	4	3	4	4	4	2	4	4	3	3	4	3	0
SME	4	4	4	3	4	4	2	3	4	2	4	3	1
SME	4	2	4	4	4	3	3	3	3	4	4	4	0
SME	5	3	1	4	5	3	4	4	5	4	4	4	0
SME	4	3	3	4	4	4	4	4	5	4	5	4	0
SME	3	3	3	3	4	3	3	3	2	4	3	4	0
SME	2	2	2	2	2	2	2	2	2	2	2	2	0
SME	1	1	1	1	1	1	1	1	1	1	1	1	0
SME	5	5	4	2	5	3	4	5	3	4	5	3	1
SME	5	3	3	4	3	4	3	3	4	5	5	5	1
SME	3		3	3	4	3	4	4	3	3	5	2	0
SME	4	4	2	4	4	4	4	4	3	2	2	2	1
SME	3	4	3	4	5	4	5	5	4	5	5	5	0
SME	5	5	1	5	4	3	3	1	3	4	5	2	0
SME	3	3	3	4	4	3	4	3	4	4	4	4	0
SME	4	3	3	4	3	3	3	3	4	1	2	1	0
SME	4	4	3	3	4	3	4	3	4	4	3	2	0
SME	4	2	3	4	4	2	4	4	4	4	4	4	1
SME	4		3	4	4	5	4	4	4	4	4	4	0
SME	2	2	2	2	4	4	3	2	2	4	4	4	0
SME	4	4	3	3	4	3	4	5	4	4	5	5	0
SME	3	3	3	3	4	3	4	5	4	4	5	3	0
SME	4	4	2	4	4	2	4	4	2	4	3	4	0
SME	4	2	3	3	4	2	3	3	4	4	4	3	0
SME	5	4	3	5	5	5	5	5	5	4	5	5	0
SME	5	5	5	4	4	5	5	4	4	4	4	4	0
SME	3	3	4	3	4	3	4	4	4	4	4	4	0
SME	4	3	3	4	4	4	4	4	4	4	4	4	0
SME	4	3	3	2	4	4	4	4	4	4	4	4	1
SME	3	3	3	3	3	3	4	4	4	3	3	3	0
SME	5	4	3	4	4	3	3	4	4	4	4	4	1
SME	5	4	3	4	4	4	5	5	4	5	5	5	0
SME	3	3	3	3	5	5	3	3	3	4	4	4	0
SME	3	2	2	2	3	2	4	1	2	3	3	4	0
SME	5	3	3	2	4	2	4	4	4	3	4	4	0
SME	4	3	3	3	3	3	4	4	4	4	4	4	0
Median	4	3	3	4	4	3	4	4	4	4	4	4	19,5%
Q3 (SMEs)	5	4	3	4	4	4	4	4	4	4	5	4	
Q1 (SMEs)	3	3	3	3	4	3	3	3	3	3	4	3	
Q3-Q1 (SMEs)	2	1	0	1	0	1	1	1	1	1	1	1	

Type Responde	Div. Infrastructure	Walkability	Bike-ability	Acc. Car	Acc. PT	Acc. GM by F	Shared space	Shared Facilitie	Event Spaces	Flexible workplaces	Parks	Squares	Div. Inh.	Retail	Horeca	Internet	Q. Mat.	Mod. Mat.	Flex. Space	Publicity	Uniqueness	Brand	Awareness		Affordab	Flex. Co	Shared f	3rd plac	Pres. Oth	Pres. Large Firms
Startup	4	4	4	4	4	4	4	4	3	4	4	3	3	2	4	2	3	3	4	3	4	4	0		4	4	3	4	4	4
Startup	4	4	4	5	5	4	3	3	4	5	5	3	3	3	4	5	4	4	2	4	4	4	0		5	4	3	4	3	1
Startup	4	5	5	3	5	5	4	4	4	4	5	5	3	3	4	2	4	5	4	4	5	5	0		5	5	5	5	4	4
Startup	3	3	3	4	4	4	4	4	4	4	3	3	3	3	4	3	4	4	4	4	4	4	0		4	4	5	4	4	3
Startup	3	4	5	1	3	2	4	4	2	5	4	4	4	4	4	4	3	3	4	3	5	5	1		5	4	5	4	4	3
Startup	4	4	4	4	4	4	4	4	2	3	4	3	4	3	4	4	5	4	4	4	5	4	0		4	5	4	4	3	3
Startup	3	3	4	4	4	4	4	4	3	3	2	1	1	3	4	5	4	4	4	4	4	4	0		4	4	4	4	5	5
Startup	4	3	4	5	5	5	3	4	4	3	2	2	3	4	4	3	4	5	3	4	5	4	1		4	4	5	5	4	2
Startup	4	3	4	4	4	4	3	4	4	3	3	2	2	4	4	4									4	4	5	4	2	2
Startup	4	4	5	4	5	4	4	3	5	5	4	3	4	2	4	4	4	4	4	3	4	4	0		2	2	4	5	4	2
Startup	4	4	4	4	5	5	4	4	4	4	4	3	2	2	4	5	5	5	5	4	5	5	0		4	4	5	5	4	2
Startup	4	4	4	5	5	5	4	4	3	2	4	4	3	5	5	4	4	3	3	5	5	4	0		4	3	3	4	4	4
Startup	4	4	4	5	4	3	4	4		3	3	3	3	3	4	5	4	4	4	4	4	3	0		5	4	4	3	3	3
Startup	2	2	2	4	5	5	4	3	4	2	1	1	1	4	4	2	3	4	3	3	4	4	0		5	4	2	4	1	1
Startup	5	5	5	4	5	5	4	4	4	5	4	4	4	3	3	5	4	4	4	4	4	4	0		5	5	5	5	4	4
Startup	3	4	4	3	4	4	3	3	4	4	4	4	2	3	4	2	4	4	4	4	4	4	1		4	4	3	3	4	4
Median	4	4	4	4	5	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4	4	4			4	4	4	4	4	4
Q3 (Start-ups)	4	4	4	4	5	5	4	4	4	4	4	4	3	4	4	5	4	4	4	4	5	4			5	4	5	5	4	4
Q1 (Start-ups)	3	3	4	4	4	4	4	4	3	3	3	3	2	3	4	3	4	4	4	4	4	4			4	4	3	4	3	2
Q3-Q1 (Start-ups)	1	1	0	0	1	1	0	0	1	1	1	1	1	1	0	2	0	0	1	1	1	0			1	0	2	1	1	2

Table A4. Results Questionnaire sub-area 1 (Central Station West)

Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Ran	Shared S	Shared f	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Q. Mat. F	Mod. M	Transpar	Flex. Sp	Serendip	Uniq. ID	Uniq. ID.	Int. Rep.	Overall Attr./Qual.
Student (1)	5	5	5	2	5	4	4	3	4	3	4	2	4	4	5	5	5	3	4	5	4	3	4	4	3	4	5
Student (1)	2	4	3	3	2	4	2	2	4	4	2	5	4	4	4	4	2	3	4	4	3	4	4	2	2	2	4
Student (1)	5	4	4	2	5	4	4	3	4	4	5	4	5	5	5	5	4	4	4	5	4	4	5		2	4	4
Student (1)	4	4	4	4	5	3	2	2	2	2	2	2	5	3	5	5	5	4	5	5	4	4	2	5	5	4	4
Student (1)	4	2	4	4	4	1	1	3	1	4	3	1	3	5	4	4	4	1	3	4	4	3	3	2	2	3	3
Student (1)	4	4	4	2	5	5	4	4	5	2	3	4	4	4	4	4	4	4	4	5	4	4	3	2	2	4	4
Student (1)	4	4	2	3	4	4	3	4	4	2	2	3	4	4	4	4	4	3	4	3	4	4	4	4	4	4	4
Student (1)	5	5	5	4	4	5	4	5	3	4	4	3	2	4	5	5	4	4	4	4	1	4	3	3	4	4	4
Student (1)	4	5	5	2	3	1	1	4	2	5	1	2	4	4	5	4	2	1	3	4	4	4	4	4	1	3	2
Student (1)	2	3	3	2	3	4	4	4	4	5	2	4	3	3	4	4	4	3	4	4	4	4	4	3	3	3	3
Student (1)	4	5	5	3	3	4	4	4	2	2	2	4	4	5	4	4	4	5	4	5	5	2	4	3	4	4	5
Student (1)	4	4	4	1	4	4	4	4	2	3	2	5	4	4	2	4	3	1	4	4	2	4	4	2	2	4	4
Student (1)	4	5	5	2	4	4	4		4	1	3	2	4	5	4		4	5	4	4	4	4	5	4	4	5	4
Student (1)	4	4	4	3	4	4	3	3	4	5	2	2	3	3	4	3	3	3	4	4	4	4	2	4	3	3	4
Student (1)	4	5	2	2	5	4	4	3	4	4	4	4	3	4	4	3	3	2	4	4	4	4	4	5	5	5	4
Student (1)	4	5	5	4	5	4	5	2	4	2	3	4	3	3	4	4	4	3	4	3	4	2	2	5	5	5	3
Student (1)	4	5	5	3	5	4	2	4	2	4	5	4	5	4	4	4	4	1	4	2	2	5	4	2	1	5	4
Student (1)	4	5	5	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Student (1)	4	5	4	4	4	4	3	4	4	4	4	3	3	4	3	4	4	4	4	4	4	4	4	4	3	4	4
Student (1)	4	4	2	3	5	2	3	2	2	3	1	2	2	2	4	2	2	3	3	4	2	3	1	3	3	3	2
Student (1)	3	4	4	3	4	3	3	2	1	5	4	2	3	5	2	3	3	4	3	4	4	3	4	5	4	5	3
Student (1)	4	3	3	3	4	4	4	3	3	3	1	4	4	4	3	2	2	2	3	4	2	4	4	3	4	4	3
Student (1)	4	5	5	3	4	4	4	3	3	4	4	4	4	3	4	4	4	4	4	5	4	3	4	4	4	4	4
Student (1)	3	3	3	2	5	3	3	3	4	3	4	3	3	4	4	4	4	4	4	4	4	4	4	3	3	4	4
Student (1)	3	4	4	3	4	4	4	5	4	5	4	5	4	4	4	4	4	4	4	4	5	4	4	4	4	4	5
Student (1)	4	4	4	5	4	4	4	4	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4
Student (1)	5	4	4	3	5	5	5	3	5	2	3	3	3	4	4	4	4	4	3	3	4	3	3	4	4	3	4
Student (1)	4	4	5	3	3	4	4	4	4	3	3	2	3	5	5	5	4	5	5	5	4	4	3	4	2	3	4
Student (1)	5	4	3	3	5	4	4	4	4	3	3	3	4	4	4	4	4	3	4	4	4	4	3	4	4	4	4
Student (1)	5	5	5	3	2	4	4	3	5	5	4	4	3	5	5	4	3	5	4	4	5	5	4	4	4	5	5
Student (1)	5	4	5	2	4	3	4	3	2	4	3	4	4	4	5	4	4	3	4	5	3	4	3	3	3	4	4
Student (1)	4	3	1	2	5	2	2	4	1	2	1	1	1	5	3	4	2	4	4	4	2	4	1	4	3	4	4
Student (1)	5	4	3	3	5	4	4	3	4	4	3	3	4	5	5	5	4	4	5	5	4	4	3	2	2	4	3
Student (1)	4	4	3	4	5	2	3	4	2	2	4	4	2	5	4	2	4	1	3	4	2	4	4	3	4	3	4
Student (1)	3	5	4	2	5	3	4	4	5	4	4	5	5	3	5	5	3	4	4	5	3	3	4	2	3	5	4
Student (1)	5	4	5	2	4	4	4	3	5	1	2	4	5	1	5	5	5	4	4	5	5	4	3	5	5	4	5
Student (1)	4	4	4	2	4	4	4	3	3	2	4	2	4	3	4	4	3	4	4	4	4	4	4	4	2	4	3
Student (1)	4	4	4	2	4	4	4	3	4	4	2	4	4	4	4	4	3	5	4	4	4	4	4	3	3	3	3
Student (1)	3	5	5	5	5	4	4	4	4	1	2	3	3	4	2	4	4	5	4	3	5	4	2	2	2	2	3
Student (1)	4	5	5	3	5	4	4	3	5	5	4	5	4	3	4	4	4	3	4	4	5	3	4	3	4	4	4
Student (1)	3	2	4	1	5	4	4	4	5	3	3		4	2	4	4	3	4	4	4	3	4	4	1	3	5	4
Student (1)	2	5	4	2	5	4	3	2	2	4	2	2	2	4	4	4	4	5	3	4	3	4	2	3	3	4	4
Student (1)	4	4	4	4	4	3	3	2	2	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4
Median	4	4	4	3	4	4	4	3	4	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4
Q1	4	4	4	2	4	4	3	3	2	2	2	2	3	3	4	4	3	3	4	4	3	4	3	3	3	4	4
Q3	4	5	5	3	5	4	4	4	4	4	4	4	4	4	5	4	4	4	4	5	4	4	4	4	4	4	4
Q3-1	0	1	2	1	1	1	1	1	2	2	2	2	1	1	1	0	1	1	0	1	1	0	1	1	2	1	1

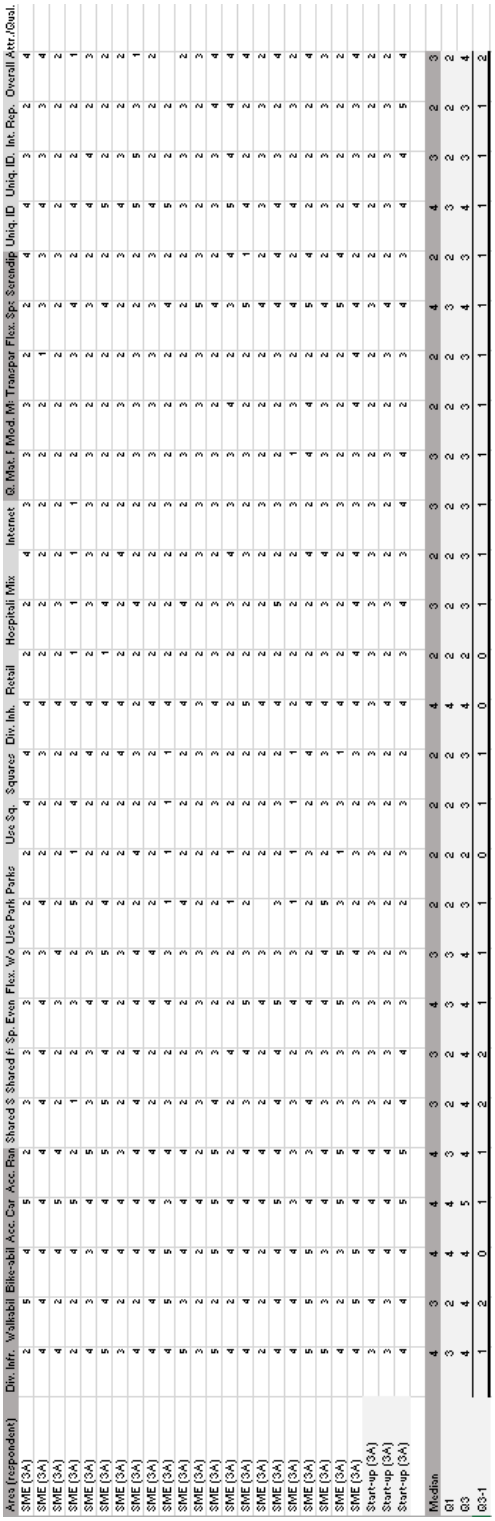
Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Ran	Shared S	Shared f	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Q. Mat. F	Mod. M	Transpar	Flex. Sp	Serendip	Uniq. ID	Uniq. ID.	Int. Rep.	Overall Attr./Qual.
Staff (1)	4	4		2	5	4	4	4	2	2		2	5	5	5		4	2	4	5	4	5	2	4	4	3	4
Staff (1)	4	4	4	2	5	4	4	4	4	3	3	2	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4
Staff (1)	4	5	4	3	5	3	3	3	3	2	4	4	4	2	5	4	4	3	4	4	3	4	3	2	2	4	4
Staff (1)	4	4	4	3	4	4	4	4	4	4	4	3	3	4	4	4	4	3	4	4	4	4	3	3	3	3	3
Staff (1)	4	4	4	4	5	3	3	4	4	1	3	3	3		4	4	3	3	3	4	4	4	3	4	4	4	4
Staff (1)	5					4		4	2	5	4	4	4	5	5	5	4	3	4	4	4	2	4	4	4	4	4
Staff (1)	4	5	5	4	4	3	3	4	4	3	4	4	4	3	4	4	3	3	4	4	4	2	3	3	3	4	4
Staff (1)	4	4	4	1	4	5	5	4	3	3	3	3	4	3	4	4	3	3	3	4	2	4	2	4	4	4	5
Staff (1)	4	5	4	3	5	5	5	3	2	4	4	5	2	4	5	5	4	3	3	4	4	2	2	3	3	4	5
Staff (1)	4	4	4	2	4	4	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	3	4	3	3	3
Staff (1)	4	1	4	2	5	4	4	4	4	4	3	3	3	3	4	4	4	4	3	3	4	3	4	4	4	4	4
Staff (1)	4	3	3	1	4	3	3	4	3	4	3	4	4	4	4	4	4	3	4	4	2	3	3	3	2	4	3
Staff (1)	4	3	3	2	4	4	4	4	3	4	4	3	3	4	4	4	2	3	4	3	2	3	2	3	3	4	4
Staff (1)	3	4	4	2	4	2	1	3	2	3	3	3	2	3	4	5	3	2	3	2	1	2	2	2	1	3	3
Staff (1)	5	1	2	2	4	2	2	4	2	4	2	4	2	3	4	4	3	2	2	2	2	3	2	4	4	5	4
Staff (1)	5	5	5	3	5	4	4	4	3	3	2	3				4	4	3	4	4	2	4	3	5	4	3	3
Staff (1)	4	4		3	4	3	3	4	3	4	2		4			4	4	3	3	4	3	2	3		2	3	3
Staff (1)	5	5		4	5	4	5	2	4	1	1	2	4	2	4	4	3	1	5	5	3	4	4	5	4	4	5
Staff (1)	4	4	4	2	5	4	4	4	4	2	2	4	4	4	5	5	5	3	5	5	5	5	3	3	3	3	4
Median	4	4	4	2	5	4	4	4	3	3	3	3	4	4	4	4	4	3	4	4	4	4	3	4	3	4	4
Q1	4	4	4	2	4	3	3	4	3	3	2	3	3	3	4	4	3	3	3	4	2	3	2	3	3	3	3
Q3	4	5	4	3	5	4	4	4	4	4	4	4	4	4	5	4	4	3	4	4	4	4	3	4	4	4	4
Q3-1	0	1	0	1	1	1	1	1	2	2	2	1	1	1	1	0	1	0	1	0	2	2	1	1	1	1	1

Table A5. Results Questionnaire sub-area 2 (Laakhaven Hollands Spoor)

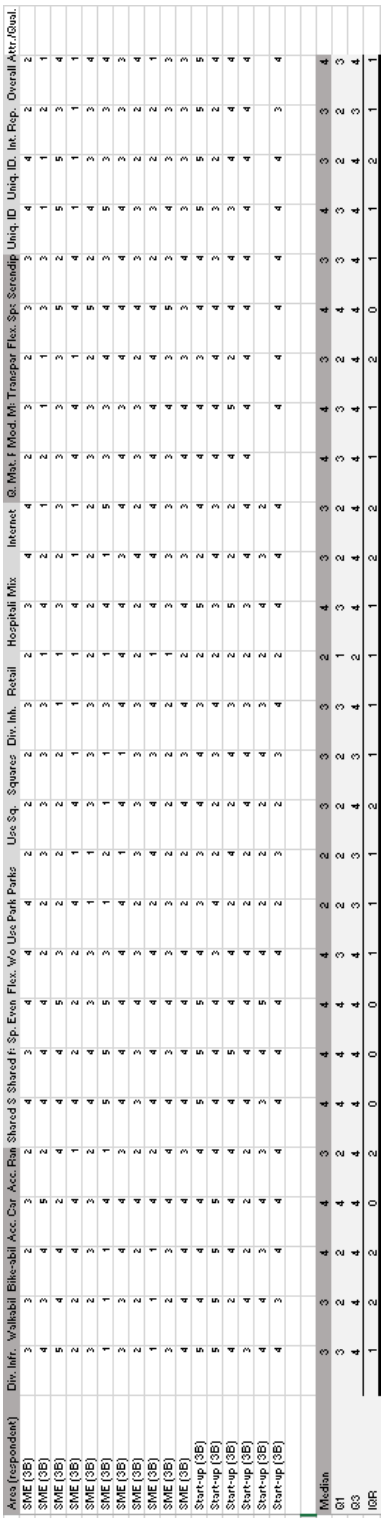
Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Ran	Shared S	Shared f	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Q. Mat. F	Mod. M	Transpar	Flex. Sp	Serendip	Uniq. ID	Uniq. ID.	Int. Rep.	Overall Attr./Qual.
Student (2)	4	4	4	4	4	4	3	3	3	2	3	2	4	3	4	4	3	2	3	3	3	3	3	3	3	3	3
Student (2)	4	4	4	2	5	4	3	3	4	5	4	5	3	5	4	5	4	2	4	4	5	5	4	4	4	4	3
Student (2)	5	4	4	2	4	4	4	4	4	3	4	4	4	5	4	5	4	2	4	2	2	3	4	3	3	4	5
Student (2)	5	5	4	2	5	4	3	2	4	5	2	4	3	5	4	4	4	4	4	4	2	3	4	3	4	5	3
Student (2)	3	4	4	4	4	4	4	4	4	3	4	3	3	4	4	4	4	4	4	3	4	4	3	3	3	4	4
Student (2)	5	3	2	2	5	2	2	3	2	1	4	2	4	3	5	2	3	5	4	4	4	2	4	3	3	1	4
Student (2)	5	3	2	2	5	2	2	4	1	2	2	4	4	3	5	4	3	1	4	4	4	2	3	2	3	2	4
Student (2)	4	2	3	3	4	4	4	3	4	1	3	4	3	4	4	4	4	4	3	3	3	4	4	2	2	3	4
Student (2)	5	4	4	5	4	4	4	3	4	3	4	3	2	2	4	2	3	4	3	4	3	4	4	2	2	3	3
Student (2)	3	4	4	4	2	3	3	4	3	2	3	3	4	5	3	4	3	4	4	3	3	3	3	4	3	4	4
Student (2)	4	4	4	4	2	4	4	4	3	3	3	4	4	4	3	4	4	2	4	4	3	4	4	4	4	4	5
Student (2)	5	5	5	4	3	4	4	4	4	3	3	3	3	4	3	3	3	3	4	4	4	4	4	4	4	4	4
Student (2)	4	4	4	3	4	4	4	5	2	4	3	4	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Student (2)	4	4	4	3	5	3	4	3	4	1	3	1	4	4	4	3	2	3	3	2	2	4	2	2	2	2	3
Student (2)	3	4	2	2	5	4	2	4	3	3	3	2	4	4	4	3	4	3	3	4	4	3	3	4	3	3	3
Student (2)	4	4	3	4	3	4	4	3	5	1	3	1	3	2	4	4	3	5	4	4	3	2	4	4	4		3
Student (2)	5	5	5	4	5	5	4	4	4	4	4	5	4	4	4	4	5	4	3	4	4	4	4	4	4	4	4
Student (2)	4	5	5	4	4	3	4	3	3	4	3	4	3	4	4	4	4	4	4	3	4	4	4	4	3	4	3
Student (2)	5	4	4	4	5	2	3	3	2	3	4	4	4	5	5	5	5	4	3	4	4	4	4	4	3	4	4
Student (2)	4	4	4	3	5	3	3	2	3	3	2	2	2	4	4	2	3	3	2	3	4	4	4	4	4	3	3
Student (2)	3	4	4	4	3	4	4	4	3	4	2	5	4	4	4	4	3	3	4	3	4	4	4	4	4	3	3
Student (2)	5	4	5	4	5	4	4	5	4	4	2	4	4	4	5	5	4	4	3	3	4	4	5	2	3	4	5
Student (2)	4	4	4	1	3	4	4	4	4	3	4	2	3	4	4	4	3	4	4	4	4	3	4	4	4	3	5
Median	4	4	4	4	4	4	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4
Q1	4	4	4	2	4	3	3	3	3	2	3	2	3	4	4	4	3	3	3	3	3	3	4	3	3	3	3
Q3	5	4	4	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Q3-1	1	0	0	2	2	1	1	1	1	2	1	2	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1

Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Ran	Shared S	Shared f	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Q. Mat. F	Mod. M	Transpar	Flex. Sp	Serendip	Uniq. ID	Uniq. ID.	Int. Rep.	Overall Attr./Qual.
Staff (2)	4	4	4	3	4	3	4	4	2	2	2	2	3	4	4	4	3	2	3	4	4	3	4	4	3	3	3
Staff (2)	4	4	5	3	5	3	3	4	4	2	2	4	4			5	3	2	4	4	4	4	4	4	2	2	3
Staff (2)	5	3	5	3	5	2	2	2	2	3	1	3	1	2	2	4	2	1	3	4	2	2	2	3	3	3	2
Staff (2)	5	4	5	3	5	4	4	2	4	4	2	4	3	4	2	4	3	2	2	3	4	3	3	3	3	3	2
Staff (2)	4	2	3	4	4	3	4	3	4	3	2	3	3	4	3	4	4	3	4	4	3	4	3	4	3	3	3
Staff (2)	5	5	5	4	5	4		3	2	2	2	3	3		2	4	2	2	5	5	4	3	4	1	2	3	4
Staff (2)	4	4	4	4	4	2	3	4	3	1	1	1	4	3	2	3	2	1	3		4	4	1	2	2	3	3
Staff (2)	4	4	2	4	4	4	5	5	5	4	2	4	4	3	4	5	4	4	3	4	2	2	4	3	3	2	3
Staff (2)	5	4	4	2	4	4	2	4	4	2	2	2	4	5	4	5	4	4	4	3	2	4	3	3	4	3	2
Staff (2)	5	4	4	3	5	4	5	5	3	4	3	4	4	5	4	4	4	3	3	4	3	4	3	4	4	3	3
Staff (2)	1	1	1	1	1	4	3	2	5	2	3	3	3	4	2	5	4	4	4	4	3	2	1	2	3	3	4
Staff (2)	5	5	5	5	5	4	4	4	3	3	2	2	3	5	3	2	2	2	3	4	4	4	2	4	4	4	3
Staff (2)	4	4	3	2	5	4	4	4	3	2	1	2	1	4	4	4	4	3	3	3	3	3	3	3	3	3	2
Staff (2)	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	3	4	3	4	3	3	3	3	3	3
Staff (2)	5	5	5	5	5	5	5	5	5	2	4	2	4	5	5	5	5	3	5	5	5	5	1	4	2	3	4
Staff (2)	4	4	4	4	4	4	4	4	4	3	4	3	4	5	4	4	4	3	3	3	2	4	2	4	3	3	3
Staff (2)	5	5	5	5	5	2	2	4	4	4	2	2	2	4	3	4	3	2	3	3	4	4	4	4	2	2	2
Staff (2)	5	5	5	4	5	2	5	5	4	2	2	4	4	5	5	5	5	2	4	5	4	2	4	5	5	5	4
Staff (2)																											
Staff (2)	5	4	4	4	4	5	5	4	4	2	3	3	4	4	5	4	4	3	4	4	4	3	3	4	2	2	3
Staff (2)	5	2	4	4	4	4	3	3	3	3	3	3	3	5	2	4	3	2	3	3	3	3	3	2	2	2	2
Staff (2)	4	2	2	4	3	2	2	2	2	2	2	2	2	2	4	4	2	2	3	3	3	2	2	5	2	3	2
Staff (2)	4	3	4	2	4	4	3	4	3	3	2	3	4	4	2	4	3	3	3	3	2	4	3	2	2	3	3
Staff (2)	5	5	5	3	5	5	5	5	5	3	5	3	5	5	4	4	3	3	4	4	3	3	3	3	3	3	3 -
Staff (2)	5	5	5	5	4	4	4	4	3	3	3	3	4	5	3	5	4	3	4	4	2	3	4	3	3	3	3
Staff (2)	4	4	4	4	4	4	4	4	4	3	2		5	4	4	4		4	4	3	3	3	3	2	2	4	3
Staff (2)	4	4	5	4	5	4	4	3	3	4	1	3	2	4	2	4	2	3	3	4	3	3	2	3	2	2	2
Median	5	4	4	4	4	4	4	4	4	3	2	3	4	4	4	4	3	3	3	4	3	3	3	3	3	3	3
Q1	4	4	4	3	4	3	3	3	3	2	2	2	3	4	2	4	3	2	3	3	3	3	2	3	2	3	2
Q3	5	5	5	4	5	4	4	4	4	3	3	3	4	5	4	5	4	3	4	4	4	4	4	4	3	3	3
Q3-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	0	1

Table A6. Results Questionnaire sub-area 3A&B (Binckhorst)



Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Pub	Shared $	Shared F.	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Q. Mat. F	Mod. Mi	Transpar	Flex. Spc	Serendip	Uniq. ID	Uniq. ID	Int. Rep.	Overall Attr./Qual.
SME (3A)	2	5	4	5	2	3	3	3	3	4	2	2	4	4	2	2	2	4	3	2	3	2	4	4	3	2	4
SME (3A)	4	4	4	4	4	4	4	4	3	4	2	2	3	4	2	2	2	2	2	2	1	3	3	4	3	3	4
SME (3A)	4	2	4	5	4	2	2	3	4	2	4	2	2	4	2	3	2	2	2	2	2	2	2	3	2	2	2
SME (3A)	2	2	4	5	2	1	2	3	2	5	1	4	2	4	1	1	1	1	2	3	3	4	2	4	2	2	1
SME (3A)	4	3	3	4	5	3	3	4	3	2	2	2	4	4	2	3	3	3	3	2	2	3	2	4	2	2	3
SME (3A)	5	4	4	4	5	5	4	4	5	4	2	2	2	4	1	4	2	2	2	2	2	4	2	5	4	2	2
SME (3A)	3	2	4	4	3	2	2	2	4	2	4	2	4	4	2	2	4	2	2	3	2	2	3	4	3	2	2
SME (3A)	4	4	4	4	4	4	2	2	4	2	4	2	4	4	2	2	4	2	3	3	3	3	2	5	5	2	1
SME (3A)	4	2	4	4	4	3	2	2	3	4	1	2	2	4	2	2	2	2	2	2	2	2	2	4	2	2	2
SME (3A)	5	3	4	4	4	2	2	2	3	4	2	2	2	4	2	2	2	2	2	2	2	2	2	4	2	2	2
SME (3A)	3	2	2	5	5	4	3	2	3	2	2	3	3	3	2	2	2	2	3	2	2	3	2	4	2	2	2
SME (3A)	5	2	5	5	4	4	3	2	3	2	2	3	3	4	2	3	3	3	3	2	2	5	4	4	2	2	3
SME (3A)	4	2	4	4	4	2	2	2	3	2	2	3	3	4	2	2	3	3	3	2	2	4	2	4	2	2	3
SME (3A)	4	4	4	4	4	3	2	2	3	2	2	3	3	4	2	2	3	3	3	2	2	3	2	4	2	2	3
SME (3A)	2	2	2	4	4	2	2	4	3	2	2	4	2	4	2	2	3	2	2	2	2	4	2	4	3	2	4
SME (3A)	4	4	4	5	4	3	2	4	3	2	1	2	2	4	2	2	3	2	2	2	2	4	2	4	3	2	4
SME (3A)	5	5	5	4	4	3	2	4	3	2	2	4	2	4	2	2	3	2	2	2	2	5	4	4	2	2	4
SME (3A)	5	3	3	4	4	3	3	3	4	2	2	3	3	4	3	3	4	3	3	2	2	4	2	4	2	2	3
SME (3A)	4	2	3	5	5	4	3	4	5	3	1	3	3	4	2	2	4	2	3	2	2	5	4	4	2	2	3
SME (3A)	4	5	5	4	4	3	3	3	4	2	3	2	3	4	4	4	4	4	3	3	4	4	2	4	3	2	4
Start-up (3A)	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	2	2	2	2	2
Start-up (3A)	3	3	4	4	4	2	3	3	2	2	2	2	2	4	2	3	3	2	2	3	2	4	2	3	3	2	2
Start-up (3A)	4	4	4	5	5	4	4	4	3	3	3	3	2	4	2	3	4	3	3	2	3	4	2	4	4	5	4
Median	4	3	4	4	4	3	3	4	3	2	2	2	3	3	2	2	3	2	2	2	2	4	2	4	2	2	2
Q1	3	2	4	4	4	2	2	3	3	2	2	2	3	4	2	2	3	2	2	2	2	4	2	4	2	2	2
Q3	4	4	4	5	4	4	4	4	4	3	2	3	4	4	2	3	4	3	3	3	3	4	3	4	3	3	4
Q3-1	1	2	0	1	1	2	2	1	1	1	0	1	1	0	0	1	1	1	1	1	1	2	1	2	1	1	2



Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Pub	Shared $	Shared F.	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Q. Mat. F	Mod. Mi	Transpar	Flex. Spc	Serendip	Uniq. ID	Uniq. ID	Int. Rep.	Overall Attr./Qual.
SME (3B)	3	3	2	3	2	4	3	4	4	4	2	2	2	3	2	3	4	4	2	3	2	3	3	4	4	2	2
SME (3B)	4	3	4	5	2	4	4	4	2	2	3	3	3	3	1	4	2	1	2	1	1	3	3	1	1	2	1
SME (3B)	5	4	4	2	4	4	4	5	3	2	2	2	2	1	1	3	2	2	3	3	3	5	2	5	5	3	4
SME (3B)	2	2	3	3	2	4	4	3	3	1	1	3	3	3	2	2	2	2	2	3	2	5	2	4	3	3	4
SME (3B)	1	1	1	4	1	5	5	5	3	1	2	1	1	3	1	4	1	5	3	3	4	4	4	5	3	3	3
SME (3B)	3	3	4	4	3	4	4	4	4	4	1	4	1	4	4	4	3	4	3	3	4	4	4	4	3	3	3
SME (3B)	2	2	2	4	2	3	3	4	3	2	3	3	3	3	2	2	4	2	3	3	2	4	2	4	3	2	4
SME (3B)	1	1	1	4	2	4	4	4	4	2	4	4	3	4	1	4	4	4	4	4	4	4	3	3	2	2	1
SME (3B)	3	2	3	4	4	3	4	3	4	2	3	2	2	4	2	1	3	3	4	3	3	5	4	4	3	3	3
SME (3B)	4	4	4	4	3	4	4	4	4	3	3	4	4	3	2	2	4	3	4	4	3	4	3	5	5	5	5
Start-up (3B)	5	5	5	4	4	4	5	5	4	3	3	4	4	4	2	2	5	2	4	4	4	4	3	5	5	5	5
Start-up (3B)	4	2	4	4	4	4	5	4	4	2	4	2	3	4	3	2	5	2	2	4	5	2	4	4	4	4	4
Start-up (3B)	3	4	2	2	4	4	4	4	4	2	4	2	4	3	2	2	4	4	4	4	4	4	4	4	4	4	4
Start-up (3B)	4	4	3	4	3	3	4	5	4	2	2	2	4	3	2	2	4	3	2	4	4	4	4	4	4	4	4
Start-up (3B)	4	3	4	4	4	4	4	4	4	2	3	2	3	4	2	4	4	4	4	4	4	4	4	4	4	3	4
Median	3	3	4	4	3	4	4	4	4	2	2	3	3	3	2	4	3	3	4	4	3	4	3	4	3	3	4
Q1	3	2	2	4	2	4	4	4	3	2	2	2	2	3	1	3	2	2	3	3	2	4	3	3	2	2	3
Q3	4	4	4	4	4	4	4	4	4	3	3	4	3	4	2	4	4	4	4	4	4	4	4	4	4	3	4
IQR	1	2	2	0	2	0	0	0	1	1	1	2	1	1	1	1	2	2	1	1	2	0	1	1	2	1	1

Table A7. Results Questionnaire sub-area 4 (New World Campus), 5 (Laan van NOI North) & 6 (Central Station East)

Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Pub	Shared $	Shared F	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Qt. Mat.	Mod. Mi	Transpar	Flex. Spa	Serendip	Uniq. ID	Uniq. ID	Int. Pop.	Overall Attr./Qual.
SME (4)	4	2	2	3	4	3	3	4	4	3	2	4	2	4	2	2	3	3	1	1	1	3	4	2	3	2	
SME (4)	5	2	2	4	5	3		3	4	1	1	2	1	4	2	2	3	2	1	1	3	4	1	2	2	2	3
SME (4)	4	4	4	5	5	5	2	5	5	4	3	2	3	4	2	1	2	4	2	2	1	4	3	3	3	3	2
SME (4)	4	3	4	4	4	4	4	4	4	2	2	2	4	2	2	2	2	2	2	1	2	4	2	2	2	1	1
Start-up (4)	1	1	2	4	4	1	1	2	2	5	1	1	2	5	2	3	1	1	3	3	3	1	5	1	3	2	2
Start-up (4)	5	2	3	3	5	4	4	4	4	5	2	5	2	5	2	3	1	1	3	3	3	2	5	4	2	4	4
Start-up (4)	4	2	2	4	4	4	4	4	4	2	2	3	3	4	2	2	2	2	2	2	2	2	4	2	2	2	2
Median	4	2	2	4	4	4	4	4	4	3	2	3	2	4	2	2	2	2	2	2	2	2	4	2	2	2	2
Q1	4	2	2	4	4	4	3	2	4	4	2	2	2	3	2	1	2	2	2	1	1	4	2	2	2	2	2
Q3	5	3	4	4	5	4	4	4	4	5	2	5	3	4	2	2	2	2	3	3	2	5	4	3	3	3	3
IQR	1	1	2	1	1	1	2	1	0	3	1	3	2	1	0	1	0	1	1	2	1	1	2	1	1	1	1

Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Pub	Shared $	Shared F	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Qt. Mat.	Mod. Mi	Transpar	Flex. Spa	Serendip	Uniq. ID	Uniq. ID	Int. Pop.	Overall Attr./Qual.
Jacobs Nederland B.V.	5	3	5	4	5	4	4	4	4	2	3	4	5	4	5	5	5	5	5	5	4	4	3	3	2	4	5
Rotterdamse Dakentuin	2	5	5	2	5	4	5	2	5	5	4	1	4	5	5	4	2	4	2	4	4	4	4	2	3	4	5
Stienen Nederland N.V.	4	4	5	3	4	3	4	3	4	3	2	2	4	4	1	2	2	3	4	4	3	3	3	2	2	2	2
Stienen	5	4	4	5	5	4	4	3	4	2	3	3	3	4	3	3	3	3	4	3	4	3	3	2	2	3	4
Tracks Inspecteur	4	4	4	4	5	4	5	5	5	4	2	4	4	3	3	4	4	3	4	3	3	4	4	4	4	4	4
Rathenau Instituut	5	4	4	5	5	2	3	2	2	4	2	2	4	2	3	3	2	2	2	2	2	4	2	2	2	2	2
DANS	2	3	3	5	5	4	4	4	4	5	3	3	3	4	4	4	4	4	2	2	2	4	2	1	1	3	3
EDCTP	4	4	4	4	4	3	3	3	3	4	3	3	3	4	2	3	3	2	2	2	3	4	3	2	2	3	3
Median	4	4	4	4	5	4	4	3	4	4	3	3	4	4	3	4	4	4	3	3	4	4	3	2	2	3	4
Q1	4	4	4	4	5	3	4	3	4	3	2	2	3	4	3	3	2	2	3	2	3	3	2	2	2	3	3
Q3	5	4	5	5	5	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	3	3	2	4	4
IQR	2	0	1	1	0	1	1	1	1	2	1	2	1	0	1	2	2	2	1	2	1	1	1	1	0	1	2

Area (respondent)	Div. Infr.	Walkabil	Bike-abil	Acc. Car	Acc. Pub	Shared $	Shared F	Sp. Even	Flex. Wo	Use Park	Parks	Use Sq.	Squares	Div. Inh.	Retail	Hospitali	Mix	Internet	Qt. Mat.	Mod. Mi	Transpar	Flex. Spa	Serendip	Uniq. ID	Uniq. ID	Int. Pop.	Overall Attr./Qual.
IWA	4	5	5	3	5	4	3	4	4	5	5	5	4	5	5	5	5	4	2	4	4	4	4	3	3	4	4
Universiteit Leiden	4	5	4	3	5	4	4	4	3	2	4	3	4	4	4	5	3	3	4	4	4	3	3	2	4	4	
Leiden University	5	3	4	2	5	4	3	3	3	5	5	4	4	4	3	4	4	4	2	3	4	4	4	1	1	1	3
Tno	5	4	3	2	3	2	3	2	4	4	4	2	4	4	2	2	4	3	4	4	2	5	4	2	2	3	4
Leiden University	5	5	4	4	5	2	3	1	2	5	5	5	3	2	4	2	2	2	5	5	3	1	1	2	3	3	4
Leiden University College	5	4	4	3	5	4	3	3	4	4	5	5	5	5	4	4	4	3	2	4	3	3	2	4	4	2	4
Leiden University College	5	5	5	4	5	4	2	3	3	4	4		4	3	4	4	4	4	3	4	3	2	3	2	1	3	2
OIOC	4	4	4	3	5	2	2	2	2	3	2	3	4	2	2	3	3	3	2	3	4	2	1	1	1	3	2
Hil	5	5	5	5	5	3	3	3	4	4	4		4	4	4	4	4	4	4	4	4	4	4	4	3	4	4
Vsumh	5	2	2	4	5	5	5	4	3	5	5	3	3	2	5	5	5	5	3	2	1	5	5	4	3	3	3
ministerie	4	3	2	4	4	3	3	4	2	5	3	5	4	3	5	5	4	3	4	4	3	4	4	3	3	3	5
Ministerie van Buitenlandse	4	2	2	1	4	4	4	4	4	5	2	2	2	4	4	4	4	2	3	4	4	3	3	2	2	3	3
Platform31	4	3	3	2	5	4	4	4	4	5	4	5	4	2	5	4	4	4	2	4	4	2	4	4	4	3	4
platform31	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	4	4	4	3	4
Koninklijk Conservatoriu	4	4	4	3	4	3	4	3	3	2	3	2	3	4	4	4	4	4	4	4	3	2	3	2	2	3	2
Koninklijk Conservatoriu	4	4	4	2	5	3	3	2	3	4		4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	2
Kon. Conservatorium	4	4	4	4	4	2	2	4	4	3		3	2	4	4		4	5	4	3	3	4	3	4	4	4	3
Koninklijk Conservatoriu	4	4	5	5	5	4	4	4	2	4	4	2	2	4	3	4	4	2	4	4	4	3	4	2	2	3	3
Koninklijk Conservatoriu	5	4	4	4	5	5	4	4	4	4	2	4	2	4	5	5	5	2	5	5	3	1	3	2	2	3	3
Ministerie van Buitenlandse	4	4	4	2	5	4	5	4	2	5	5	4	5	3	4	5	4	3	3	4	2	4	2	1	2	3	4
Median	4	4	4	3	5	4	3	4	3	4	4	4	4	4	4	4	4	3	4	4	3	4	3	3	3	3	3
Q1	4	4	4	2	5	3	3	3	3	4	3	3	3	3	4	4	4	3	3	3	2	3	3	2	2	3	3
Q3	5	4	4	4	5	4	4	4	4	5	5	5	4	4	5	5	4	4	4	4	4	4	4	4	3	3	4
IQR	1	1	0	2	0	1	1	1	2	1	2	2	1	1	1	1	0	1	1	1	2	1	1	2	1	0	1

Table A8. Overview of ambitions and ratings per sub-area

AMBITIONS INNOVATION DISTRICT					
	Infrastructure		**Functions & Amenities**	**Design**	**Image**
	• Decrease use of cars • Better division of use of modes of transport (modal split) • Optimal accessibility • Less space taken up by infrastructure • Increase walkability • Increase bike-ability • Sustainability		• Mix of functions • Day & night activity • More housing • Start-up climate • Event-city • Student-city • Live- and work environment for young (entrepreneurial) people • City centre environment	• Increase open appearance of buildings • Flexibility of space (suitable for multiple uses) • Inviting public space • Connect buildings with environment (main routes)	• Create a strong brand • Commitment • Strong international reputation • Cluster for Peace, Justice, Security and governance
SATISFACTION					
SUB-AREA	**+ / -**	**Infrastructure**	**Functions & Amenities**	**Design**	**Image**
1 CENTRAL STATION WEST	+	• Walkability • Bike-ability • Connection with greater metro • Modal split	• Amount of Hospitality services • Amount of Shops • Diversity of inhabitants • Shared spaces • Shared facilities • Spaces for events • Function mix	• Open appearance buildings • Flexibility office/workspace • Quality materials public space • Modern appearance public space	• International reputation • Overall attractiveness
1 CENTRAL STATION WEST	-		• Amount of Parks • Public internet connections • Student housing • Meeting places for students • Study places outside of faculty building		• Uniqueness identity • Brand CID not well-known
2	+	• Walkability • Bikeability	• Amount of squares	• Modern appearance public space • Quality public space	• Uniqueness identity on national level

LAAKHAVEN HOLLANDS SPOOR		• Connection with greater metro • Modal split	• Presence of hospitality services • Presence of public internet connections • Presence of shops • Diversity of inhabitants • Shared spaces • Shared facilities • Space for events	• Open appearance buildings	
2 LAAKHAVEN HOLLANDS SPOOR	-	• Accessibility by car*	• Amount of parks • Place to study outside of faculty building • Housing for students	• Connection with surroundings/city	• Uniqueness identity on international level • Brand CID not well-known
3 BINCKHORST	+	• Connection with greater metro • Accessibility by car		• Flexibility buildings	• I'm Binck community • Raw look • Binckhorst Festival
3 BINCKHORST	-	• Walkability • Accessibility by Public transport • Train tracks cause barriers • Parking facilities	• Mix of functions • Activity in late hours • Mono-functional areas • Amount of housing • Amount of parks • Amount of squares • Amount of shops/supermarkets • Public internet connections	• Open appearance buildings • Modern appearance • Quality public space • Amount of unexpected encounters • Sustainability	• Brand CID not well-known • Low level of commitment
4 NEW WORLD CAMPUS	+	• Accessibility by public transport • Connection with greater metro	• Shared facilities • Event-spaces	• Flexibility	
4 NEW WORLD CAMPUS	-	• Walkability • Bike-ability	• Amount of parks • Amount of squares • Amount of retail • Amount of hospitality services • Public internet connections • Mix of functions	• Quality materials public space • Modern appearance materials public space • Open appearance buildings	• Uniqueness identity • Attractiveness • International reputation • Brand CID not well-known
5 LAAN VAN NOI NORTH	+	• Walkability • Bike-ability • Accessibility by car		• Open appearance buildings • Flexibility	

		• Accessibility by public transport			
5 LAAN VAN NOI NORTH	-		• Spaces for events • Amount of parks • Amount of Hospitality services • Amount of retail	• Modern appearance • Amount of unexpected encounters	• Uniqueness Identity • Brand CID not well-known
6 CENTRAL STATION EAST	+	• Walkability • Bike-ability • Connection with greater metro • Modal split	• Amount of Hospitality services • Amount of Shops • Diversity of inhabitants • Shared spaces • Shared facilities • Spaces for events • Function mix • Amount of Parks	• Flexibility office/workspace • Quality materials public space •	• International reputation • Overall attractiveness
6 CENTRAL STATION EAST	-		• Public internet connections • Student housing • Meeting places for students • Study places outside of faculty building		• Uniqueness identity • Brand CID not well-known

Table A9. Dependencies between actors in the CID

Actor	Important resource	Degree of replicability	Dependency	Critical actor?
Educational Institutions	Knowledge	Low	High	Yes
Knowledge institutions	Knowledge	Medium	Medium	Yes
Firms	Production	Medium	High	Yes
Housing corporations	Production	Medium	Medium	No
Developers	Production	Medium	Medium	No
Start-ups/ Scale-ups	Production	Low	High	Yes
Consulting firms	Knowledge	Medium	Medium	No
Inhabitants	Legitimacy	Low	High	Yes

Table A10. Overview of respondents questionnaire

Sub-area	Firm/Institution	Type of Respondent	Amount of respondents
1	University of Leiden	Student	40
		Staff	16
	Royal Academy of Art	Student	3
		Staff	3
2	The Hague University of Applied Sciences	Student	24
		Staff	20
	ROC Mondriaan	Staff	1
3A	Simulise Current architecture+urbanism WaiterPro Leisure Advies bv OpMaat producties lucdevriesarchitect Colorworks Goalkeeper B.V. PIP Marsel Loermans fotografie Goalkeeper BV Sport Pretoga Bureau Open Blik Fietslabyrint Kernwaarde Groen De Verbouwregisseur SimGas Swisscap B.V. WiezeWasjes KOW Omniscale Comptel First1 Bedrijfsfitness Posad	Employee	26
3B	SECRID BV Kroodle architectuurstudio Kristel Paladin Studios SINHBuilding Solutions BV LB-IX Kyboko DutchGiraffe	Employee	18

	EmigratieBeurs BV WorkWire SINH Building Solutions eBrella S-Jeu ZooStation BV HUB Footwear Stefan Olsthoorn Interieur LB-IX Winkwaves		
4	Vince.delivery VisaCare Part-up Waterwatch Cooperative Nyota Publieke Versnellers Perspectivity	Employee	7
5	Siemens Nederland N.V. (2) Nationale Nederlanden Tracks Inspector Jacobs Nederland B.V. EDCTP DANS Rathenau Instituut	Employee	8
6	Vewin HiiL CICC IWA Platform31 (2) Tno Ministerie van Buitenlandse Zaken (2) Ministerie van Binnenlandse Zaken en Koninkrijksrelaties Royal Conservatory (4) University of Leiden (2)	Employee	17

Table A11. Overview of interviewees

Name interviewee	Role
Municipality of The Hague	
Kees de Leeuw	Traffic/Infrastructure
Martin Paasman	Urban Deisng / Binckhorst
Marcel van der Klaauw	Education
Daan Rijnders	Economy/HSD
Eit Hasker	Urban Design / CID
Marcel de Rouw	Housing
Enno Ebels	PSO
Erik Pasveer	Hoofd DSO
Anne-Marie Hitipeuw	International
External	
Ronald Wall	Professor Erasmus University
Peter Tjia	Innovation Quarter
Sabrina Lindemann	OpTrek

Table A12. Overview of events attended in the context of this research

Event	Date
Power of Hubs	22 June 2017
Placemaking Week	11 October 2017
Werkconferentie CID	21 April 2017
Roadmap Next Economy (MRDH)	13 April 2017
ICT Café The Hague	15 March 2017
Great Books Special Master City Developer "So you think you have an innovation district?"	13 February 2017

Table A13. Overview clusters in the Central Innovation District (sectors and amount of firms)

Bink36		Caballero Fabriek		New World Campus		HSD	
Sector	**#**	**Sector**	**#**	**Sector**	**#**	**Sector**	**#**
Design & Communication	26	Design & Communication	25	Impact Economy	41	(Cyber)security	53
Business Services	22	IT	19				
IT	20	Architecture & Urbanism	7				
Events	16	Photography & Video	3				
Photography & Video	14	Gaming	3				
Product & Innovation	14	Typography	2				
Fashion	14						
Architecture & Urbanism	13						

Table A14. Overview of the specifics of firms in The Central Innovation District

Firm	Employees	Turnover (Mln)	R&D Expenses (Mln)
Siemens	2135	€ 1200	€ 1.4
T-mobile	1439	€ 1500	€ 84.1 (in Germany)
Jacobs	1247	€ 235	-
AT&T	257	€ 144	-
Q42	53	€ 3.5	-
Secrid	40	€ 7.4	-
Tracks Inspector	4	€ 1.4	-
Tymlez	2	-	-

Table A15. Overview of the identified actors in the Central Innovation District

Steer	Demand							
Public	**Universities**	**Firms**	**(Start-up) clusters**	**Knowledge Institutions**	**Ministries**	**NGOs**	**Housing Association**	**Transport**
Municipality The Hague	Leiden Universiteit	T-Mobile	Bink 36	TNO	Foreign Affairs	CICC	Staedion	HTM
	Haagse Hogeschool	Siemens Nederland B.V.	Caballero fabriek	Platform 31	Home Affairs	The Hague Institute for the internationalization of Law (HiiL)	Vestia	ProRail
	ROC Mondriaan	Thales	HSD	DANS		Vewin		
	Royal Academy of Arts	AT&T	New World Campus	Rathenau Instituut		IWA		
	Royal Conservatory	Nationale Nederlanden	World Trade Centre					**Other**
		Tracks Inspector						National Archive
Private		Jacobs Nederland						Central Government Real Estate Agency
Developers		EDCTP						
		KPN						
		Secrid						
		Q42						

Figure A1. Overview of actors, their respective goals and obstacles in the CID

(Koppenjan & Kleijn, 2004)

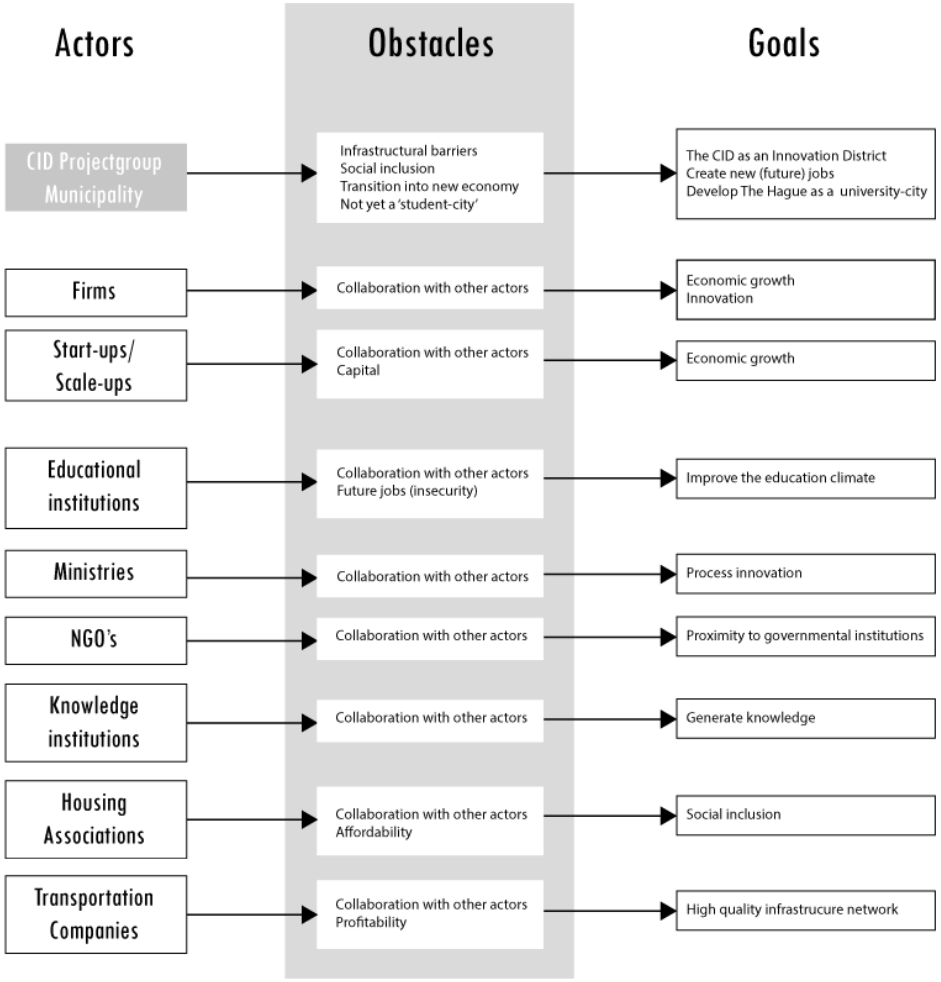


Figure A2. Classification of actors (Koppenjan & Kleijn, 2004)

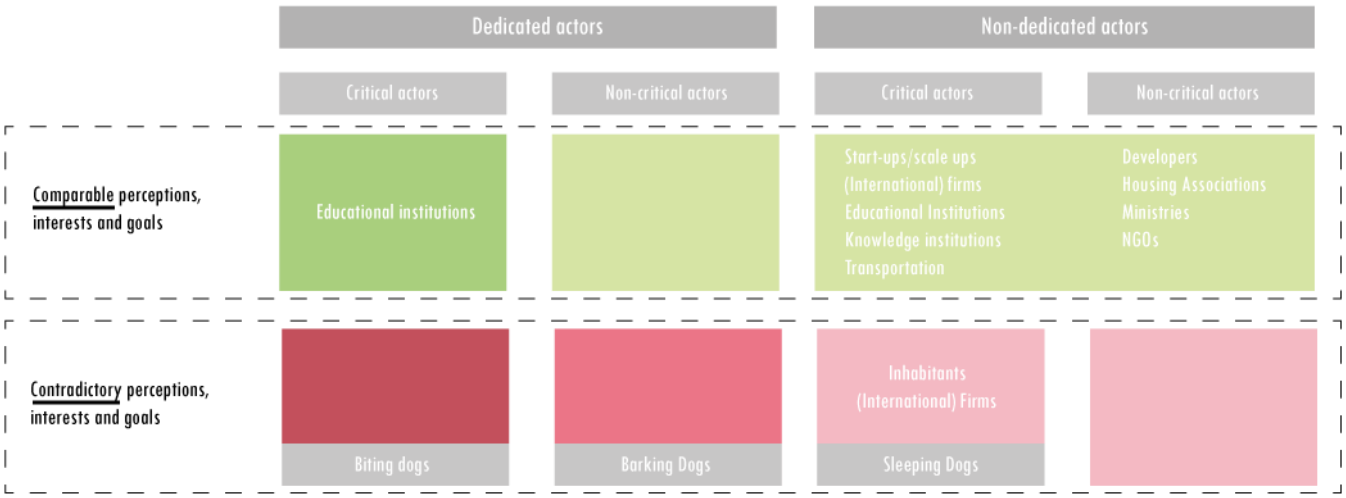
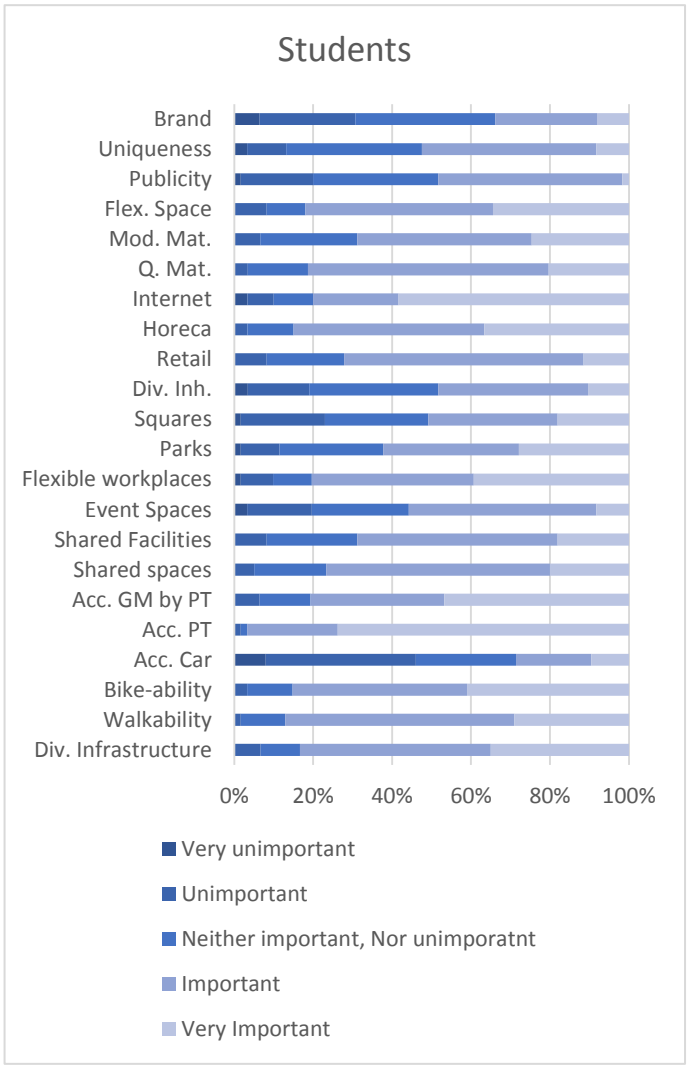


Figure A2&A3. Frequency distributions importance per variable (Students & University Staff)



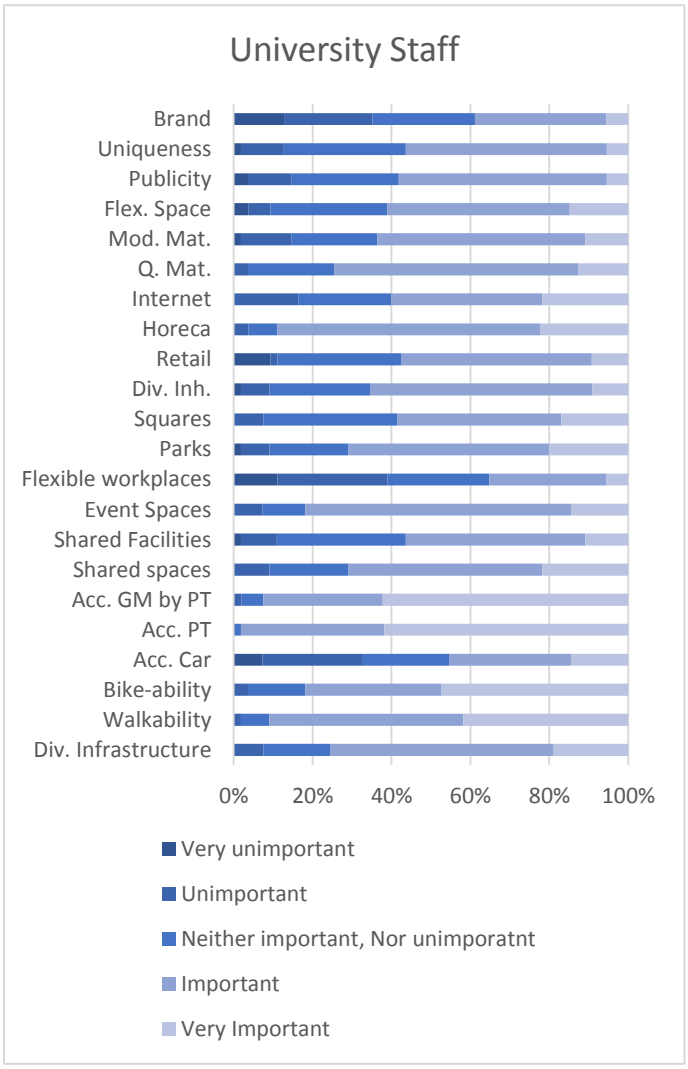
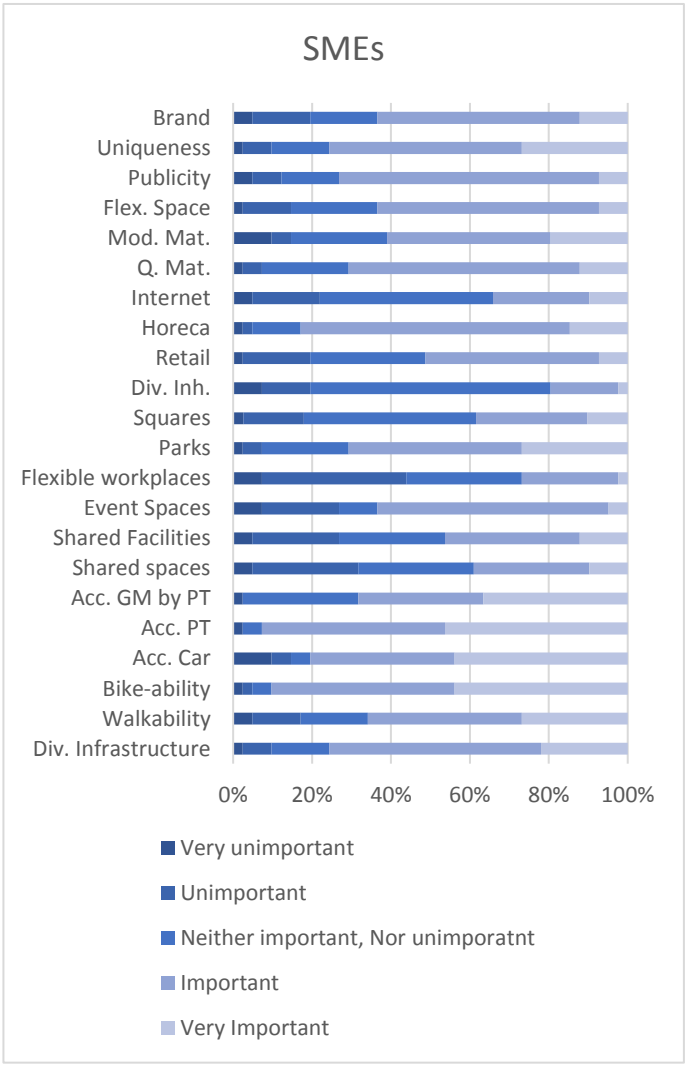


Figure A4&A5. Frequency distributions importance per variable (SMEs & Start-ups)



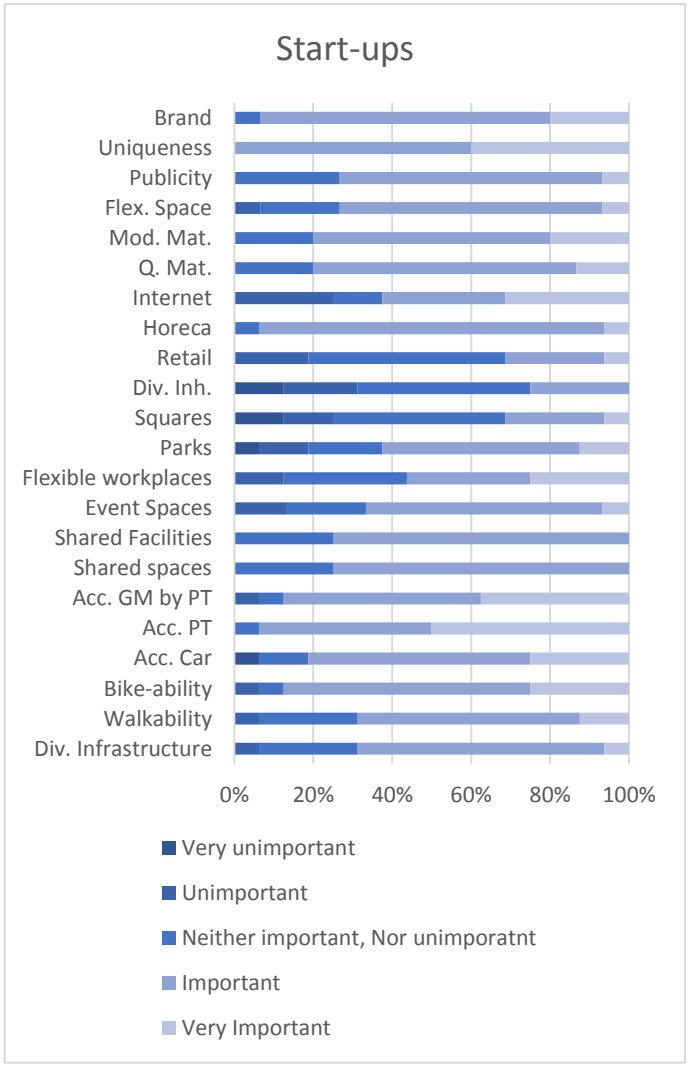
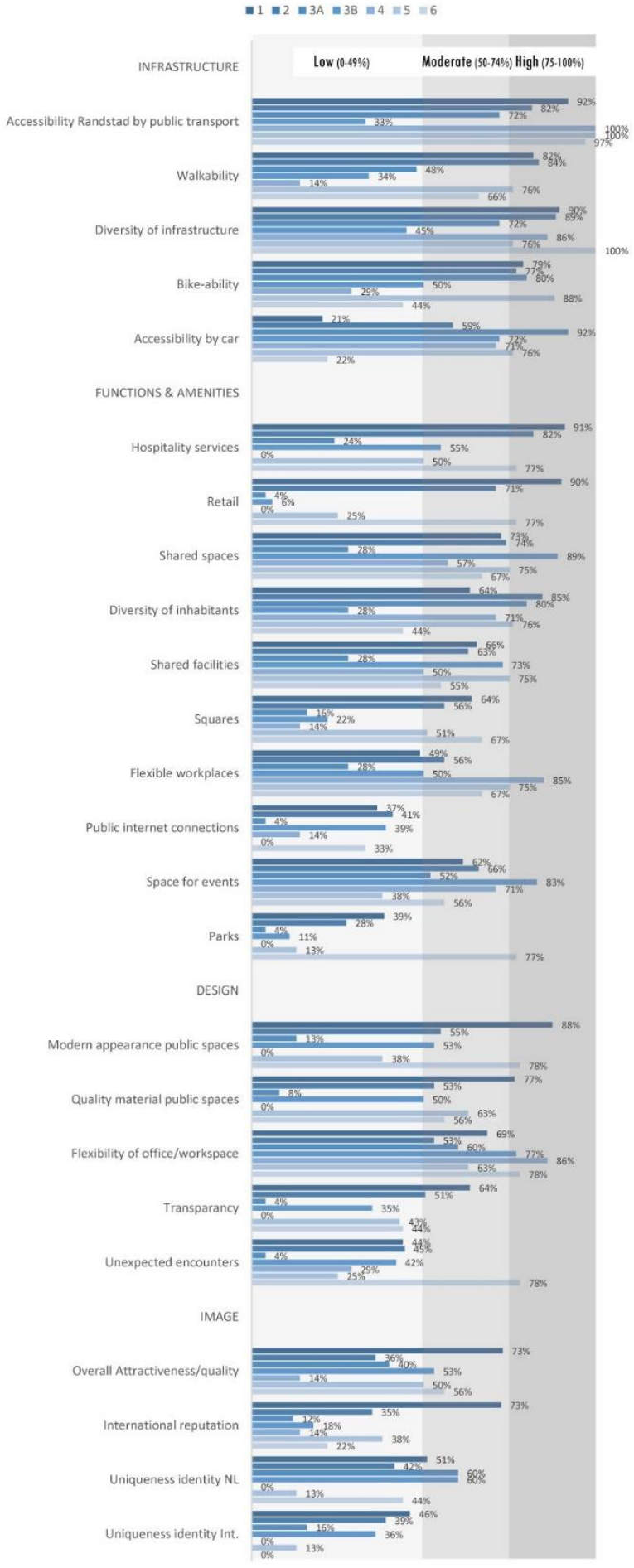


Figure A6. Level of satisfaction per sub-area



Interview Protocol Placemaking Week 11 October 2017

1. How do people connect with each other that are part of the same professional field or profession? Is it, only through formal work channels or also socially/informally?) How to idea generation? What ingredients?

2. How do people connect with each other that are part of different professional fields (e.g., social innovation and cyber security) new people > brainstorm > new ideas > working laboratory > people that you don't have next to you in your office > elaborating

3. If making stronger connections within the same field and across different fields as a means to innovate, what could be the role of public spaces beyond lunches, food trucks and good benches?

Interview Protocol

This graduation research focuses on the physical aspects of the innovation district in The Hague. It attempts to find out what the physical elements are that can help to support innovation in the district. The interview will start with several questions relating to your function within the municipality of The Hague. Hereafter, the interview will cover the topic of innovation and the definition thereof. Subsequently, the main ambitions for the district will be discussed as well as the corresponding policies that will attempt to fulfil these ambitions. The final section of the interview is open to any issues that you (the interviewee) feel the need to mention as these are important aspects of the ambitions and policies of the municipality of The Hague.

Introduction

- What is your role in the development of the CID project?

Innovation

- How would you define 'innovation'?
- What do you consider to be innovation within the CID?

Ambitions and policies

- What are the main ambitions for the district from the perspective of your department?
- How can/will these ambitions be realized?

[*Room for discussion about emerging topics*]

Questionnaire

Thank you for taking the time and effort to fill out this survey.

This survey is being used as part of my graduation thesis for a master's degree at the TU Delft. I'm combining this research with an internship at the municipality of The Hague, where I am involved with the development of the Central Innovation District (CID).

This survey mostly focuses on the physical aspects of your immediate surroundings. Each subtopic will be questioned by means of several statements and a few open questions. You can click one of the options provided with each statement that is closest to your opinion. An important remark with this survey is that the questions are about your immediate surroundings and not about the CID as a whole.

If you feel neutral about a certain topic, you can click the option "Neither agree, nor disagree"
By clicking "Continue/Doorgaan" (at the bottom of this page), you can start the survey.

Kind regards,

Tuur Pluijmen

*** Additional information ***

The purpose of this survey is to gain an insight into the preferences of firms and institutions in and around the Central Innovation District (CID) in The Hague with regard to the built environment. Below you can see a map, which gives an idea of the area of the CID. The CID doesn't have any strict borders, but can be regarded as the triangle between Central Station, Station Hollands Spoor and Station Laan van NOI. It could therefore be that the location of your firm/institution is located outside of this triangle. This research therefore does not regard the triangle as a border of the area.

General Information

*If you are a student, please fill out your university or educational institution as "firm/institution"

1. What is the name of the firm/institution you work for?
2. In which sector does your firm/institution mostly operate?
3. What is your job title within your firm/institution?
4. At which location (adress) do you mostly work? (Adress)
5. In which sub-area is this location? Pick a number from the map below
6. Is the firm/institution you are working for (or are the owner of) one of the following: *
If you are a student, please pick "University/Educational institution"
Mark only one oval.
A University / Educational Institution *Skip to question 7.*
A start-up *Skip to question 17.*
None of the above *Skip to question 27.*

University / Educational Institution

7. Under which of the following categories would you list yourself?
Mark only one oval.

Student *Skip to question 8.*
PhD candidate (/teacher) *Skip to question 14.*
Researcher (/teacher) *Skip to question 14.*
Teacher *Skip to question 14.*
Other: *Skip to question 14.*
Skip to question 14.

Student

Please click the answers that come closest to your opinion regarding the different statements

8. "The building of the university/educational institution (where I mostly have classes) is well-connected to its environment"

* Does the building have clear entrances and connections with the street, or is it very closed off the outside world and facing inwards?

9. "The area around the building of the university/educational institution offers a sufficient amount of facilities for students outside of study-hours"

* Here you can think about facilities such as sports or leisure

10. What kind of facilities for students are missing in the area around the building of the university / educational institution?

11. "In my university/educational institution there are a sufficient amount of spaces available where I can study"

12. "The area around the building of my university / educational institution offers a sufficient amount of spaces where I can study"

13. "It is easy for students to get a place to live close to my university/educational institution"

The following questions will be asked from the perspective of an employee. However, students can still answers these questions by regarding "firm" or "employee" respectively as "University/educational institution" or "student"

Skip to question 27.

University / Educational Institution

Please answer the following questions. If you do not know the answer to a specific question, you can leave it open.

14. "The building of the university/educational institution (where I mostly have classes) is well-connected to its environment"

* Does the building have clear entrances and connections with the street, or is it very closed off the outside world and facing inwards?

15. With which universities or educational institutions in the nearby environment does your university/educational institution work closely together with and how?

16. With which firms/institutions in the nearby environment does your university/educational institution work closely together with and how?

Skip to question 27.

Start-ups

These questions are meant for people who are the owner of/work for a start-up.
Please fill out the table first. Hereafter, please answer the related questions.

* Flexibility lease-contract: For example, the flexibility in terms of ending a lease-contract.
* Shared facilities: For example, spaces or equipment that your firm can use in a shared manner with other firms.
* Places for meeting: Think about spaces that can be temporarily reserved or spaces outside of the building in which you work, like cafés, restaurants, etc.

17. To what extent are the following aspects important to you?

Mark only one oval per row.

Price of office-space (affordability)

Flexibility leasecontracts
Presence of shared facilities
Presence of places for meeting with people
Presence of other start-ups
Presence of other
(large) firms

18. "There are a sufficient amount of spaces available in my nearby surroundings where startups can rent a space"

19. "The lease-agreements are flexible, which makes it easy for start-ups to get a space"
(Think about, for example, the flexibility in terms of being able to end a lease-contract on short notice)

20. "There are a sufficient amount of shared facilities available in my nearby surroundings that I can use to make my firm grow"
(For example, spaces or equipment that your firm can use in a shared manner with other firms)

21. Which facilities are missing in your nearby surroundings that could help to make your firm grow?

22. "There are a sufficient amount of spaces available in my nearby surroundings that I can use to meet with people to discuss things"
(This could be a café or a restaurant, or spaces that can be reserved temporarily).

23. "I work together a lot with start-ups/small organizations in the building in which I am located"

24. "I work together a lot with start-ups in The Hague"

25. "I work together a lot with (international) firms in The Hague"

26. "In my nearby surroundings there are a sufficient amount of spaces available where new products or developments can be shared with the outside world"
(Think about, for example, spaces where a new product of a start-up can be temporarily displayed)

Infrastructure

27. To what extent are the following aspects important to you?
Diversity of infrastructure
Walkability
Bike-ability
Accessibility by car
Accessibility by public transport
Accessibility Randstad by public transport

28. "My immediate environment has a high diversity of infrastructure"

29. "My immediate environment is walkable"

30. "My immediate environment is bike-able"

31. "My immediate environment well-accessible by car"

32. "The area in which I work is well connected with the Randstad by public transport"

Amenities & Resources

33. To what extent are the following aspects important to you?
1. Presence of shared spaces
2. Presence of shared facilities
3. Presence of spaces for events
4. Presence of flexible workspots
5. Presence of parks
6. Presence of squares
7. Diversity of inhabitants
8. Presence of retail
9. Presence of hospitality services (cafés, restaurants etc)
10. Public internet connections

34. "There is a sufficient amount of shared spaces available in my immediate surroundings which my firm/institution can use"

35. "There is a sufficient amount of shared facilities available in my immediate surroundings which my firm/institution can use"

36. "There is a sufficient amount of event-spaces available in my immediate surroundings"

37. "There is a sufficient amount of flexible workplaces/desks available in my immediate surroundings where I can work temporarily"
(Outside of your own office)

38. "I make use of the parks in my immediate surroundings"
With the extent to which you agree with this statement, you can indicate the extent to which you make use of the parks in your immediate surroundings. With "using a park" you can think of, for example, sitting in a park during lunch.

39. "There is a sufficient amount of parks in my immediate surroundings"

40. "I make use of the squares in my immediate surroundings"
With the extent to which you agree with this statement, you can indicate the extent to which you make use of the squares in your immediate surroundings. With "using a park" you can think of, for example, sitting on a square during lunch.

41. "There is a sufficient amount of squares in my immediate surroundings"

42. "The origin of inhabitants in my immediate surroundings is diverse"

43. "There is a sufficient amount of retail in my immediate surroundings to provide for the area"
(Do you have a wide selection of shops to choose from, or is the supply of retail limited?)
Mark only one oval.

44. "There is a sufficient amount of hospitality services in my immediate surroundings to provide for the area"
(Do you have a wide selection of hospitality services (cafés, restaurants, etc.) to choose from, or is the supply limited?)
Mark only one oval.

45. "There is a strong mix of different functions in my immediate surroundings"
(A strong mix of functions means, for example, an area where shops, cafés and dwellings are mixed together)
Mark only one oval.

46. "The public space in my immediate surroundings is provided with high-quality internet connections at many different locations which allows me to work online anywhere"
Mark only one oval.

Design

These questions discuss the design of the built environment. This is about the appearance of the facades and public spaces, but also the flexibility of spaces. "Public space" refers to the areas that are accessible to everyone (streets, squares, parks, public buildings, etc)

47. To what extent are the following aspects important to you?
Mark only one oval per row.
1. Quality of materials in public space
2. Modern appearance public space
3. Flexibility office/workspace

48. "The materials of the public space are of a high quality"

49. "The materials of the public space give the area a modern appearance"

50. "Most buildings in my immediate surroundings have an open appearance"
Open appearance: A lot of glass, the ground floor is visually connected to the street, etc.

51. "The space in my building is flexible, which makes many different options possible for filling in the space"

52. "I have many unexpected encounters with people I know (or have seen before) in public spaces"
Public spaces: every public space outside of the building you work in

53. Where or at what kind of places do you have the most unexpected encounters?
(Again, this is about the spaces outside of the building you work in)

Image

54. To what extent are the following aspects important to you?
Mark only one oval per row.
1. Publicity of the location

2. Uniqueness of the identity of the location
3. Brand that the area uses

55. "Already before this survey I had heard about the Central Innovation District in The Hague"

56. "The area in which I work has a unique identity in the Netherlands"

57. "The area in which I work has a unique identity on an international level"

58. "The area in which I work has a good international reputation"

59. "The overall attractiveness/quality of the area in which I work is high"
(Are the buildings and public spaces generally of a high quality and well-maintained, or is it poorly maintained and unattractive?)

Conclusion

60. Which facilities or aspects of the built environment (that haven't been discussed) that can help your firm/institution grow, are missing in your immediate surroundings?

End

This is the end of the survey. Thank you for your time.
By pressing 'SUBMIT', you can successfully end the survey.

Explanation of concepts questionnaire

Infrastructure

1. Diversity of infrastructure
The amount of differing modes of transport with which it is possible to move through your direct surroundings. (E.g. Bike, Car, Bus, Tram, subway etc.)
2. Walkability
The extent to which your direct surroundings provide in the needs of the pedestrian (think about the amount of sidewalks, a pleasant/safe environment to walk in, good connections, etc.)
3. Bike-ability
The extent to which your direct surroundings provide in the needs of the cyclist (think about the amount of cycling paths, a pleasant/safe environment to cycle in, good connections, etc.)
4. Accessibility by car
The extent to which the area in which you work is accessible by car. Is the area easy to reach through logical connections, or is it hard to reach and are there a lot of detours needed to reach the area?
5. Accessibility by public transport
The extent to which the area in which u work is accessible by public transport.
6. Accessibility Randstad by public transport
The extent to which the area in which u work is connected to the Randstad by public transport.

Functions & Amenities

1. Shared spaces
Think about meeting rooms, rooms for presentations, etc. This could be in the building in which you work, or in your immediate surroundings.
2. Shared facilities
Think about facilities such as machines, lab-equipment, etc. which can be used in a shared manner with other firms.
3. Spaces for events
Think about spaces in which, for example, lectures, workshops or cultural events can be organised.
4. Flexible workplaces/desks
Workplaces or desks that can be used in a shared manner with other people/firms in a flexible way.
5. Parks
Places in the city in which there is room for green and nature.
6. Squares
Places in the city that are open and can serve as a place to sit (e.g. for lunch) or come together.
7. Diversity in composition of inhabitants
This is about the diversity of the inhabitants that live in the area. This not only means a diversity in origin, but also in income.
8. Retail
Supermarkets, pharmacies, clothing stores, bakeries, etc.
9. Hospitality services
Restaurants, cafés, coffeebars, etc.
10. Public internet connections
Internet connections that are accessible to anyone.

Design

1. Quality materials in public space
This is about the quality of the materials that have been used in the public space. Think about the materials that are used for sidewalks, road, street furniture, etc. and the extent to which these materials are well-maintained.

2. Modern appearance public space
The extent to which the public space has a modern appearance. Think about the use of materials with a modern look, modern architecture, etc.

3. Flexibility office/workspace
Does the building consist of large, open spaces in which a lot is possible, or are the ceilings very low and are there a lot of construction elements present?

Image

1. Publicity of the location
The extent to which the area in which you work is publicly known. This could be because of its striking architecture, the presence of well-known firms, a nice living climate or other aspects that make the area known to the outside world.

2. Uniqueness of identity
The extent to which the area in which you work is unique. This could be because of the historical value of the area, but also because of its uniqueness in terms of sustainability and innovations

3. Brand
The brand of the area is what is being communicated with the outside world through marketing strategies. For this survey, this is mostly about what the added value of such a brand can be regarding the connection between firms and institutions in the area.