SPATIAL ELEMENTS IN CREATIVE CLUSTERS

by Piëternella Aten
SPATIAL ELEMENTS OF CREATIVE CLUSTERS AND THEIR IMPLICATION FOR URBAN DESIGN

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Pieternella Aten

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Research group ‘Complex Cities’ at the Department of Urbanism, Faculty of Architecture and the Built Environment - Delft University of Technology
Pieternella Aten

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First mentor: dr. Arie Romein - OTB
Second mentor: ir. Leo van den Burg - Design of the Urban Fabric

TU Delft
Faculty of Architecture and the Built Environment
Department of Urbanism
Research group: Complex Cities
This thesis presents the research done for graduating in the Master of Science from the Faculty of Architecture and the Built Environment at the TU Delft. This research has been conducted at the department of Urbanism, within the research group of Complex Cities. During this graduation process I have been under the guidance of my first mentor dr. Arie Romein, and my second mentor ir. Leo van den Burg.

The subject of this research has been the spatial elements in creative clusters and their relation to urban design. This has resulted in the development of a theoretical framework, which is discussed in chapter 2; in the proposal for the Method for Analysing Space and Defining Potential, which is discussed in chapter 3; and as an example, the application of the method in an up and coming cluster in the city of Rotterdam, which is presented in chapter 4.

Those three chapters form the body of this work. The context in which it has taken place can be found in chapter 1; the conclusion of this work can be found in chapter 5. As a compulsory part for this thesis, the reflection can be found in chapter 6.
Creative clusters have been a research topic for some decades; their importance for local economic growth and urban development has been discussed among many scholars in the fields of economy, geography, and urban planning. Recently, attention has shifted to the role of space on the micro scale in creative clusters. Gaps in knowledge exist between the spatial features and the functioning of creative clusters. The concepts of creative clusters are evolving and new research fields are emerging. This thesis joins this evolution and focusses on the knowledge gap that exist between the role of space and the functioning of creative clusters.

The four meanings of space are a new step in better understanding the spatial elements of creative clusters. It will be used in this thesis to bridge the gap between the different knowledge fields. The four meanings of space consist of an economic, social, material, and symbolic meaning of space that all contribute to the success of a creative cluster.

Based on a theoretical framework constructed around the existing literature on creative clusters, a new method is proposed: the Method for Analysing Space and Defining Potential (the MASDP). This method uses the four meanings of space to understand the current state of the space in creative clusters, ‘analysing space’. The four meanings of space are also used to image to the future state of the space in creative clusters, ‘defining potential’.

This thesis provides knowledge on the context of creative clusters from a theoretical perspective. This knowledge is then translated into a framework for urban designers. This framework lets them better understand the importance of the spatial elements in the functioning of the creative cluster. By doing this, the knowledge gap in the role of space in creative clusters and the gap between theory and practice will be narrowed.
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"You take delight not in a city’s seven or seventy wonders, but in the answer it gives to a question of yours."

— Italo Calvino, Invisible Cities
The idea for this thesis has gradually been formed in September 2016. Many have helped in shaping this idea with their conversations and recommendations. But the objective of bringing research and design closer to each other can be traced back to 2014. In search of a more academic attitude I followed the minor ‘Urban Geography’ at the University of Utrecht. There I became aware of a whole world of existing knowledge on cities. One way or another I wanted to combine that world with the world that I was educated in, here at the faculty of architecture. Of course this has been a challenge, but I believe this thesis contributes to both worlds.

This project has been an interesting, eye opening, and at some points, a confusing journey. I would like to thank dr. Arie Romein for introducing me to the subject of creative clusters and his guidance throughout this project; his knowledge has been a great inspiration. Ir. Leo van den Burg for helping me understand my own point of view towards design. I would like to thank my parents, Jan and Francien, for their confidence in me and their support when it took longer than expected. My group of friends, ‘de Dikke V’, I would like to thank for keeping me out of total isolation. Especially Jet, her continuous supply of happiness has been most welcome. Lastly, of course him, Joep, for being him. Whenever I was lost, he brought me back.

Pieternella Aten, November 2017
This chapter will present the context in which this research takes place. It will discuss first the motivation for doing this research in §1.1, then the problem definition will be discussed in §1.2 which ends in a problem statement, and will end in §1.3 with the research questions that form the basis for the remaining of this report.
§ 1.1 MOTIVATION

“Cities have always played a privileged role as centers of cultural and economic activity. From their earliest origins, cities have exhibited a conspicuous capacity both to generate culture in the form of art, ideas, styles and attitudes, and to induce high levels of economic innovation and growth, though not always or necessarily simultaneously. As we enter the twenty-first century, a very marked convergence between the spheres of cultural and economic development seems to be occurring.” (Scott, 1997, p. 323)

The importance of the creative cluster for the current economy and development of cities has been established and discussed among many scholars from the fields of economy, geography, and urban planning. The influence of the authors Florida and Landry cannot be neglected, for they brought the concepts of the creative city and the creative class to popular attention. Their work though, dating from the early 2000’s, has been widely debated. Some of these critiques will be elaborated in the following section. The fact that the strong connection between creativity, innovation, economy and cities has been established in one form or the other in many cities over the past two decades, does not mean that there is a consensus on what it all means. Despite the vagueness policy makers and planners still adopt the concepts heartily. Contributing to the knowledge on creative clusters and thereby connecting different fields and bridging theory to practice has been the main motivation to undertake this project.
§ 1.2 PROBLEM DEFINITION

This section discusses the origins of this project. It starts with the definition of creative clusters in §1.2.1. In §1.2.2 the need for research will be highlighted from the perspective of different knowledge fields. The societal and scientific relevance of this research will be discussed in §1.2.3. This section will end with the problem definition in §1.2.4.

§ 1.2.1 DEFINING CREATIVE CLUSTERS

A creative cluster is defined as a geographical concentration of creative economic activity. These clusters often contain artists with small workshops, independent designers and upcoming software developers and give a boost to the local economy. Therefore, promoting these clusters is an attractive activity for municipalities and governments. Consequently, literature on creative clusters focusses on defining the features that make up a creative cluster and how to design policies to promote these clusters.

History
The creative cluster concept emerged around the time of the rise of the cultural economy in the late 1990’s. But it really marked its existence through the works of Richard Florida and Charles Landry in the early 2000’s. Where Florida focused on the people comprising the creative class (Florida, 2002), Landry dealt with developing and running urban life in creative cities (Landry, 2000). Both Florida and Landry discussed that attracting and retaining the creative workers is essential for cities to compete. That message soon found its way into the city policies. In policy-making it is currently regarded that economic success is related to a city’s ability to attract the creative class (van Geenhuizen & Nijkamp, 2012). But the translation of the conceptual level of academia to the implementation into practice proved to be difficult. Trip and Romein (2014) see a gap between theory and policy and therefore a ‘rather weak connection’ between the two. Currently, it seems that every city needs to have policies aimed at stimulating their cultural economy: “No region of the country, whatever its industrial base, human capital stock, scale or history, is safe from the need for a ‘creative hub’ or ‘cultural quarter’.” (Oakley, 2004)

Critiques
This ready-made adoption of creative clusters in any city, seldom leads to a success: “These policies are often replicated without taking into consideration the distinctive aspects of places and circumstances.” (Comunian, 2010). Within the academic community, the appearance of the works of Florida and Landry has started many discussions on the value of creative clusters. The two main perspective of these critiques are either policy and political related, or social related. Peck (2005) states that the popularized concept of the ‘creative class’ and ‘creative cities’ are a function of the profoundly neoliberalized urban landscapes. The existing policies based on property- and market-led development, gentrification, and normalized socio-spatial
inequality are hardly disrupted by the creativity strategies. The social critiques revolve around the strong links between creative city regions and rising inequalities. McCann (2007) found that the creative city concept is often directly linked to increasing liveability in city regions. He states that, influenced by Florida's work, many cities envision the redevelopment of inner-city neighbourhoods as an economic strategy with positive implications on liveability. But often the struggle of these types of neighbourhoods revolves around fundamental questions of social reproduction. These include wage inequality, increasing costs of housing, fears of displacement and the destruction of longstanding community structures.

Both the political and the social perspectives show what Russo and Van Der Borg (2010) articulate: "The fundamental message of the "creative cities" literature, as metabolised by the boosterist policy discourse, is that a city has a duty to wisely use the opportunities that the virtuous relationship between cultural and economic development offers.", while the local aspects of places and circumstances are often forgot due to the promises of economic development.

The Netherlands
In the Netherlands, culture is explicitly considered to be a factor of social and economic development. Since the 1970s, with shifting priorities and objectives, it has been an important part of government agendas. Yet from 1990 onward, culture has sparked a new interest in local policy. The largest Dutch cities in particular turned decidedly toward culture, in part to reconstruct an "urban model" that was in crisis under the pulls of de-industrialization and immigration, and in part to nurture urban images and brands able to accelerate the process of transition to a post-industrial economy (Ministry of Education, 2003).

§ 1.2.2
NEED FOR RESEARCH
It has become clear that place is regarded as highly influential for creative clusters, based on the role of cities in the cultural economy and in cultivating creativity and innovation. Nevertheless, Stevens, and Wood and Dovey see gaps in the knowledge about the relationship of place and creative clusters:

"However, it is only very recently that researchers have pursued more detailed investigation of the spatial conditions that support the creative economy: what urban morphologies, building types and qualities of place attract and retain creative workers and foster creative production."

(Stevens, 2015, p.1)

"While the importance of quality of place to creative clustering is repeatedly acknowledged, the associated micro-spatialities and morphologies remain under-researched."

(Wood & Dovey, 2015, p.52)

These authors point to the questions that hold important knowledge for planners and designers, but have not been answered yet.
Next to possible new concepts, the concepts that are accepted, the creative capacities of cities, are themselves subject to change:

“But what is it about cities that ‘creates creativity’? We are familiar with arguments about how companies benefit from spatial aggregation, but there is little to suggest theoretically why spatial aggregation in cities, […], should lead to more creativity.”

(Hillier, 2016, p.76)

The arguments presented suggest that we should consider the creative and cultural factor as grounded in the urban context, rather than as an additive to urban discourses on economic growth.”

(Comunian, 2010, p.18)

Both perspectives point to the evolving insights in the concepts. The importance of the urban context is emerging as a field of interest and resulting in several calls for further research.

§ 1.2.3 RELEVANCE

Societal and ethical relevance
A better understanding of the role of space in creative clusters, leads to a better integration of economy, policy, and space. After the hype and the crisis, it is still alive and seen as a pillar in Dutch policy. Filling the gap in the knowledge on creative clusters makes this a relevant thesis. Several scholars point to the ‘dangers’ of promoting/supporting creative clusters, since they believe it will increase social inequality and diminish social coherence within the city population (van Geenhuizen & Nijkamp, 2012). On the side of the cultural application of creative clusters, it is believed that the commercialisation of culture will decrease the ‘real’ cultural value of that culture. This is the case with all globalisation trends, such as the cultural economy, and can therefore apply to creative clusters as well.

Despite the critiques mentioned in the introduction, creativity still "offers opportunities for urban development and the personal development of urban inhabitants.” (Borén & Young, 2013).

Scientific relevance
As was shown by the several calls for research, this thesis is relevant for the scientific community because it partly fills an existing gap in knowledge on the influence of space on creative clusters. It will combine several concepts from different academic fields (social sciences and urban design) to better understand the functioning of creative clusters. The research group of complex cities within urbanism focusses on combining such fields. Furthermore, the complex cities group deals with the complexity of multiple actors and multiple scale levels. This is relevant for this thesis because creative clusters have both a regional and very localized scope.

This thesis is rooted in the social sciences and will end in the field of urban design. The research group of complex cities is chosen because it combines and researches the influence of economy and policy, global trends and individual actions on urban structures.
§ 1.2.4  PROBLEM STATEMENT

Creative clusters are a complex subject, involved in many fields of science, multiple scale levels, and are subjected to change. It is unsurprising that creative clusters have been heavily debated in both academia and practice, and that this debate is not settled yet. The concepts of the creative cluster are evolving and new research fields are emerging. This thesis joins this evolution and focuses on the knowledge gap that exists between the role of space and the functioning of creative clusters.

§ 1.3  RESEARCH QUESTIONS AND METHODOLOGY

Based on the problem statement, the following research question has been formed for this thesis:

What are the spatial features of creative clusters and how can they be applied in a framework for urban design?

In order to answer the main research question, the following sub research questions are posed:

1. What are the spatial features of creative clusters in a theoretical context?
2. How can these spatial features be translated into an urban design method?
3. Can the urban design method be applied in the Merwe-Vierhavens area to stimulate the development of a creative cluster?

Different approaches are used to answer the three sub research questions. The used methods, goals, and outcomes are portrayed with their corresponding sub research question in figure 1. The sub research question regarding the theoretical context will be answered by conducting a literature study into different fields, resulting in a theoretical framework for creative clusters. The sub research question regarding the framework for urban design will be answered by using the gained knowledge from the theoretical framework and transforming it into a method for urban design. The application oriented sub question functions as an illustration of the proposed method, by applying the method on a developing cluster in the city of Rotterdam (NL).

With this research question knowledge will be provided on the context of creative clusters from a theoretical perspective, and some of this knowledge will be translated into a framework for urban designers. Thereby narrowing the knowledge gap on the role of space in creative clusters, and trying to connect theory to practice.
**Main research question:**
What are the spatial features of creative clusters and how can they be applied in a framework for urban design?

| Sub research question 1: What are the spatial features of creative clusters in a theoretical context? | Method: Literature study into the factors that determine creative clusters |
| Sub research question 2: How can the spatial features of creative clusters be applied in an urban design method? | Method: Developing a new method |
| Sub research question 3: Can the urban design method be applied in the ‘Merwe-Vierhavens’ area to stimulate the development of a creative cluster? | Method: Application of the method |

**Method:**
- Literature study into the factors that determine creative clusters
- Developing a new method
- Application of the method

**Goal:**
- Constructing a theoretical framework of creative clusters
- Translating the concepts from the theoretical framework into tools for urban designers
- Illustrating how the method might work in a realistic situation

**Outcome:**
- Theoretical framework
- Method for Analysing Space and Defining Potentials
- Application of the MASDP in the Merwe-Vierhavens area

*Figure 1* Table showing the research questions and their respective methods, goals, and outcomes.
In this chapter, the theoretical framework around the concept of creative clusters will be constructed. It will deal with the forces behind creative clusters, trying to unravel the spatial features of creative clusters. Firstly, the creative industries as part of the cultural economy will be discussed. The cultural economy is seen as a global trend that caused structural changes in the economic development of cities and regions (see § 2.1). In the following section, creativity, innovation, and cities will be discussed. The works of Sir Peter Hall will be used to elaborate on the relation city – innovation and culture (see § 2.2). The next section deals with the scale levels of creative clusters. The region, cluster, and community will be addressed (see § 2.3). The fourth section will elaborate on a new concept, developed by Romein and Trip (2017), called the four meanings of space. It introduces a new way of looking at the spatial elements in creative clusters (see § 2.4).

The theoretical framework will be built around the previous four sections. The layout of, or the empty framework, can be seen in figure 2. As this chapter continuous, all the elements will be filled in, resulting in the complete theoretical framework at the end of this chapter (see § 2.5).
§ 2.1 ONE GLOBAL TREND: CULTURAL ECONOMY

In this section the creative industries will be placed in the economic field. The global trend of the cultural economy will be explained to understand the products and production of the creative industries (see figure 3).

There has, since the appearance of the concept, always been a debate on the definitions used for the creative/cultural economy/industries. See for example Cunningham (2002), Flew and Cunningham (2010), or the slightly more recent Kong (2014) for the difficulties concerning the terminology and definition. This thesis has not the intention to participate in that debate, but for the sake of consistency, the following definitions will be used for creative industries and the cultural economy. Creative industries are considered here to be the businesses that produce creative goods and/or services. The cultural economy is here considered as the global trend concentrated in the larger cities, driven by the demand for creativity and innovation.

Creative industries articulations
There are different approaches on where to place the creative industries according to Moore (2014). She distinguishes four groups of these approaches. The first approach is that the spectrum of creative industries are constituted by certain sectors. This is supported by Howkins (2002), seeing the creative industries as ‘just another industry’. The second approach is that the creative industries are a group of certain occupations. This approach results in the concept of a ‘creative class’ occupying these jobs from the well-known Florida (2002). The
third approach is holistic urban development, comprising the concept of the ‘creative city’. Which has been proposed by Landry (2000), another well-known author. The fourth and last approach is seeing creative industries as an important part of a wider economic system. A system that is supporting the new economy and is "constituted as a constellation of workers, firms, institutions, infrastructures, communication channels and other active ingredients" (Scott, 2006, as cited in Moore, 2014, p.745). This new economy is, evidently, the cultural economy.

**The cultural economy**

The cultural economy emerged because the Fordist era came to an end and the Post Fordist era began. Opposed to the mass production and consumption patterns of Fordism, Post Fordism is characterized by a differentiated and fragmented consumer culture. Within this consumer culture, an important role is played by cities: " [...] the culture generating capabilities of cities are being harnessed to productive purposes, creating new kinds of localized competitive advantages with major employment and income-enhancing effects." (Scott, 1997, p. 335). There are differences among scholars to define or isolate what is part of the cultural economy, and what is not. Based on the reviews by Boggs (2009) and Gibson and Kong (2005), the four most accepted ways to identify the cultural economy are based on the symbolic content, the sectoral divide, the ways of production and employment, and finally the consumption culture.

The products of the cultural economy have a different function in society than seen before during the Fordist era. Their symbolic content is becoming more important and their utilitarian purposes are being cast aside for a more psychic gratification. The different sectors of the cultural economy all produce goods and services that are personal ornaments, modes of social display, aestheticized objects, forms of entertainment and distraction, or sources of information and self-awareness (Scott, 1997).

The sectoral divide, a distinction based on the sectors that are involved in the cultural economy, is the most used, but also the most discussed. It is a difficult distinction to use in practice, because the used sectoral definitions are often based on agriculture, extraction and services. Because of the different sectors in the cultural economy, such as art, arts & crafts, and services like coffee shops, the ‘old’ sectoral divide proves unsuited for the cultural economy (Gibson & Kong, 2005).

The way a cultural product is made, can also be an approach to the cultural economy. Mass production is an often-used parameter for such distinctions, whereby the cultural economy is seen to revolve around the mass production of cultural goods. But this has its difficulties as well. There are mass produced commodities that are not cultural products, and there are cultural products that are uniquely produced. In the process of producing cultural goods, a certain mode of employment seems to be common in the cultural economy. Firms tend to be small and individuals tend to operate on an informal, part-time contracted basis (Boggs, 2009).

An inherent quality of, but not limited to, the cultural economy is the production of services. These services are place bound, they have to be consumed on the spot. Examples are performances and cafés. Needless to say, that the cultural economy also produces goods that are mobile, and therefore not place bound (Boggs, 2009).
Each one of the four mentioned features are not able to fully describe the cultural economy separately. But seen as a whole, they prove to be useful in distinguishing the cultural economy in the current age. As this cultural economy has brought structural changes in economies around the world it can rightly be called a global trend.
§ 2.2 TWO KEY DRIVERS: CREATIVITY AND INNOVATION

That creative clusters are existing because of the cultural economy, is clear by now. But what processes happen in these creative clusters? In this section creativity and innovation are introduced as the key drivers of creative clusters; as well their relation to the city. First the connection between creative industries and cities will be discussed. After that the relationship between creativity and innovation and cities will be discussed, mainly according to the works of Hall. This section ends with the role of creativity and innovation in creative clusters.

Creativity and innovation are distinctive features of the cultural economy: “This new form of economy is characterized by a peculiar mixture of cultural content and technological elements, relying heavily on creativity and innovation” (He & Gebhardt, 2014, p. 2352). Because of the production of symbolic value, He and Gebhardt (2014) see that the creative industries are more rooted in the local urban environment than the traditional industries. One of the fervent advocates of this opinion is Richard Florida. He is well known for stressing the importance of innovative climates such as urban amenities and visual landscapes in attracting creative talents and investments. Recently he has made an even bolder statement: he argues that innovative activities are the products of cities or regions (Florida, Adler, & Mellander, 2017).

Creative and innovative cities

Based on the statements from Florida (2002, 2017) it would seem that the role of cities in either causing or facilitating creativity and innovation is something of the last age. Next to this, it would seem that creativity and innovation are completely intertwined. But as Sir Peter Hall demonstrated in his seminal book ‘Cities in Civilization’, creativity and innovation separately have played major roles in cities throughout history.

It seems, according to Hall (1999), that a creative city is a different city than an innovative city. Creativity in a city, based on the golden ages of cities in Europe throughout history, is largely found when a city is in transition. This would be a transition forward, “into new and unexplored modes of organization”. But equally important to the change, is the existing foundation of culture these cities have built up in their history. The transition creates something to react to for the creatives in the city, making the city a cultural crucible. The talent of the creative individuals was cared for by the minority who owned the wealth that was to spare. But these talented creatives themselves, feel to some degree as outsiders. They feel the need to react to important changes in the city, but the established order provides for their livelihood. They belong, and at the same time they do not belong.

The innovative city seems to be another kind of city. It is a typical city, it is neither a leading city, nor a city excluded from the masses. Its social structure is also different from the creative city. Instead of the hierarchical structure, they had a more egalitarian structure. They were free of older traditions, prejudices, and restraint; unlike the creative city that feeds on its history. The innovative city may not be in need of fierce transitions, but it is not a dull city. There is “a nervous energy, a belief that there were no limits to the possible”. In this environment, people were working in a local network but often with many different bases. They move easily from job to job or from study to study; they were not settled people. This network provided the city
Spatial elements in creative clusters

with highly specialized kinds of skilled labour, and a climate of competitors where people learned from each other. Another striking difference with the creative city is the absence of ‘old money’, and the possible presence of ‘new money’. This newly created wealth often came from innovations before, and therefore making the owners more inclined to invest it in new innovations. Which in turn, stimulates the competition among the ‘innovators’ in the city.

Concerning creative clusters today, the distinction between creative cities and innovative cities ceases to exist. As Hall has demonstrated, over the course of history there have been truly creative cities and there have been truly innovative cities. But the current creative clusters are driven both by innovation and creativity. While creativity and innovation can be found in almost every aspect of life, the most intense interaction of creativity and innovation can be found in the creative industries (Pratt, 2008).

Creativity and innovation in creative clusters

This ‘intense interaction’ of creativity and innovation in creative clusters will now be dissected by describing how creativity and innovation individually work in creative clusters. This will be done based on the works of Cooke and Lazzeretti (2008) in their book ‘Creative Cities, Cultural Clusters and Local Economic Development’.

Lorenzen and Frederiksen (2008) see the innovation dynamics of creative industries as the main reason for them clustering in cities. These innovation dynamics consist of three types of product innovation, occurring with different frequency: variety, novelty, and radical innovation. Most products are innovated by means of differentiation through variety. This means they stay close to the aesthetics, design, or narrative demands of their genres or styles. The innovation occurs thus within the pre-existing design space. This variety is the result of incremental small steps of change; this is then added to existing products. Product innovation of the variety type necessitates the clustering of creative firms. The co-location of the creative industries with related knowledge bases and specialized labour with deep and relevant skills ensures that new projects find the right results and at the same time, ensures that firms and freelancers find enough projects to thrive.

The second type of innovation is product innovation by means of differentiation through novelty (Lorenzen & Frederiksen, 2008). This means that they have broken out of established aesthetics, form or narratives; they have created new design spaces (styles or genres). Like variety, novelty is often the result of incremental change. It differs from it through the introduction of less related knowledge, gradually changing the incumbent knowledge. In order to create novelty, ideas and people from outside the project are needed. This also means that novelty can be created by clustering diverse creative industries. Therefore, novelty of creative products needs urban clustering. Cities are the places where several creative industries can cluster and where the labour market is diverse enough to induce novelty.

Lorenzen and Frederiksen (2008) round off their argument about the clustering of creative industries with radical product innovation. Since this involves only a couple of world and global cities, it will be left out in this thesis.

Just as innovation flourishes best in clusters because of the positive externalities, creativity thrives in territorialized complexes, states Costa (2008). Costa’s use of territorialized...
complexes can be compared to creative clusters, for they mean creative activities happening in a specific place: “The relationship between cultural activities and territory can be (and usually has been) approached from the perspective of the specific conditions that these activities need to establish and to develop, particularly the tangible and intangible agglomeration effects, external economies and creative ‘ambiance’, which have been, both theoretically and empirically, pointed out as fundamental to the development of cultural production and consumption” (Costa, 2008, p. 184). In his work he sees three reasons for the intertwinement of creativity and territory. The first are the economic and non-economic factors. The economic factors, comparably to innovation, are among others the agglomeration economies and reduction of transaction costs. The non-economic factors range from the social and psychological to the symbolic effects of ‘urbanity’ in a way of life. Both result in the ‘extreme importance of geographical agglomeration’. The second reason is the relevance of networks. Regardless of technology progresses and the globalization process, networks are inherently territorialized. The third reason for the territorial embeddedness is the access to material and immaterial resources. These include all the dynamics generated by the local milieu.

It can be concluded that cities are needed for creativity and innovation and that creative clusters therefore predominantly exist in cities. The need for an urban environment differs from creativity to innovation, but they share the effects of agglomeration. Co-location has many benefits for both creativity and innovation. Furthermore, the city is needed for innovation because it provides the necessary diversity in creative industries and workforces. The need for cities concerning creativity is defined by the social and material aspects. Networks, fundamental for inclusion, and material resources, offering a specific atmosphere, are provided for by cities.
§ 2.3 THREE SCALES: REGIONAL, CLUSTER, INDIVIDUAL

For the functioning of a creative cluster, the individuals are just as important as the regional infrastructures, though in different ways. Creative clusters do not succeed just because they have businesses that are geographically close to each other. "[A]s if co-location or the co-presence of CCI’s could itself determine economic development and success." (Chapain & Comunian, 2010, p. 720). This results in three different scales, acknowledging the network of creative individuals, the cluster itself, and the wider context of the urban and regional environment (see figure 4).

In this section the three scale levels will be discussed, starting with introducing the macroscale of the city and the region in §2.3.1. The following subsection of §2.3.2 will discuss the mesoscale level of the cluster itself. This section will end with the collective of the microscale level in §2.3.3.

§ 2.3.1 THE MACROSCALE OF THE REGION AND THE CITY

The cultural economy, with creativity and innovation as key drivers, has resulted in a huge demand for the people working in the creative industries. The knowledge and creativity that is captured ‘inside’ these people are now the carriers of value. According to Florida (2002), these individuals contribute to the local economic growth and are themselves creating the open and dynamic environments where they live and work. By doing so, they make that specific city or region attractive to other creatives. As a result, creative talent will be attracted and retained in certain cities and regions, causing a fierce competition between them. This competitiveness has affected policies heavily since the late 1990’s, stressing the importance of the image and identity of cities and regions (Chapain, Clifton, & Comunian, 2013; Chapain & Comunian, 2010; Comunian, Taylor, & Smith, 2014; Jayne, 2005). Many western cities have adopted these instant policies for local economic development. But, Florida’s theories are not watertight, as the critiques mentioned in the introduction have shown.

§ 2.3.2 THE MESOSCALE OF THE DISTRICT AND THE CLUSTER

The mesoscale is the level of the cluster itself. In these clusters, something is happening that does not happen somewhere else. There are two agglomerative effects at work in the mesoscale of creative clusters: density and network effects (Wood & Dovey, 2015). These agglomerative effects both come from the flow of ideas that is associated with creativity and innovation, the two key drivers for creative clustering.

The processes happening within the cluster can explain why creative industries cluster. In the past, a concept from geography found its way into the discipline of economic geography. This was the idea of clusters: geographical agglomerations of firms that enjoy economies (positive
externalities) from being located in the same place. This concept is over a century old, but has received new attention by way of a paper by Porter (1998). There are different dynamics of clustering, based on the type of economies: localization economies that enjoy positive externalities from specialization, and urbanization economies that enjoy positive externalities from diversity. Both will be discussed now, based on the works by Lorenzen and Frederiksen (2008).

The location economies are the positive externalities that firms with related knowledge bases and product offers, enjoy from their clustering and co-location. These positive externalities all result from the regional specialization of industry, the specialization of the labour market, and the specialization of institutions. For an elaboration of these positive externalities from specialization, see the second column of the table in Figure 5.

In contrast to localization economies, where co-location, rather than a particular place, is key, urbanization economies result from definite urban and place specific factors. “These economies arise from the regional diversity in cities – of industry, of labour, and of institutions and infrastructures”. For an elaboration of these positive externalities, see the last column of the table in figure 5.
§ 2.3.3 THE MICROSCALE OF THE COLLECTIVE AND THE INDIVIDUAL

In the multiscalar spectrum of creative clustering, diversity and density of face to face contact are crucial on the microscale (Wood & Dovey, 2015). The creative cluster is important for the cultural economy because it has a stimulating environment for the creative and innovative individual. In this environment, the aspects of human interaction play a major role. In their influential paper, Storper and Venables (2004) state that face to face contact is “the most fundamental aspect of proximity”. Face to face contact has the properties that can make it an efficient communication technology for tacit knowledge; it may increase trust in economic relationships; it facilitates socialisation and networking; and it provides psychological motivation. The combined effects of all these features of face to face contact are named ‘buzz’.

According to Asheim, Coenen, and Vang (2007), this buzz is the informal group-based and self-generating exchanges of information and knowledge. This is important within creative
clusters because of the one-off projects based character of most collaborations. Face to face communication is important for creative clusters in the first place because the buzz often takes place at large gatherings. So, to take full advantage of the tacit information that is ‘stored inside’ this buzz, face to face contact is key. Secondly, face to face contact is crucial in the projects themselves. In large projects such as a film production, face to face contact is necessary to deal with all the different view and preferences. This need for face to face communication and buzz, explains to some extent the importance of creative clusters. The role of a cluster in nurturing the creativity of individuals, is affirmed by (Meusburger, 2009): “Places, environments, spatial contexts, and spatial relations matter because a stimulating environment and talented individuals must come together and interact before a creative process can come into being.”
§ 2.4 FOUR SPACES: SYMBOLIC, MATERIAL, ECONOMIC, SOCIAL

As has become clear from the previous sections, in a creative cluster many different activities and actors come together. A creative cluster can therefore be seen as a multiplicity, and can as such be understood through four meanings of space. Romein and Trip (2017) see two types of qualities that form the basis of the four meanings of space: place-based qualities and cluster-based qualities. Place-based qualities can be subdivided into material and symbolic space, whereas cluster-based qualities can be subdivided in social and economic space:

"Material and symbolic space involves the physical qualities and symbolic meanings of buildings and design and morphology of the urban environment. Social and economic space concern quality of labour, linkages between firms and the role of social and business networks."

(Romein & Trip, 2017, p. 436)

These four meanings of space will be used in this section as a way to elaborate on the spatial elements in creative clusters. Although the concept of the four meanings of space is new, there is previous work to its separate elements. The following sections are based on a collection of these scholarships.

In figure 6 the four meanings of space all have their descriptive key words written down. This figure can be seen as a summary of the following sections, but cannot be seen as the 'whole truth'. Research into the spatial elements of creative clusters has only recently gotten more attention. This figure is an interpretation of the four meanings of space, and can therefore be subjected to adaptation as time and research continues.

§ 2.4.1 SYMBOLIC SPACE

Symbolic space is the quality determined by a place's image, identity and reputation. For the workers in creative clusters these are often the symbolic and emotional values connected to the look and feel of place and to the authenticity and roughness. As stated by Clare (2013, p. 55): "Hence, a place is far more than a mere collection of buildings; rather, it is a shared experience of an agglomeration of complementary benefits." Based on the current theories of collective and individualised creativity, the symbolic space plays an important role in being a catalyst for the creative production. The symbolic meaning of space can stimulate the imaginative capacities of people working in creative clusters (Drake, 2003; Heebels & Van Aalst, 2010).

A central concept in the meaning of symbolic space is the term 'embedded truth', coined by (Hutton, 2006). The embedded truth can be seen as the identity of that locality. It is apparent in the landmarks and typical buildings, the expression of the course of history. The spatial elements of symbolic space can be pointed out, but what it means personally is of course wholly subjective. This is extremely well put by Drake, in his research to the relationship between place and individual creativity: "The same place will be interpreted differently by different individuals and will provide different prompts and aesthetic raw materials. Artists and
designers may create products whose place- or locality-inspired elements are incorporated into the aesthetic or expressive elements of that product. It is possible to envisage circumstances where these products in their turn contribute to the shaping of real places. Whether these products are consumed locally, in places elsewhere, or are effectively incorporated into global flows of deterritorialised information, they will carry with them elements of the place in which they were produced and so can potentially shape how other perceive particular places.” (Drake, 2003, pp. 513-514).

The symbolic space contributes both to individual creativity and to economic activity. It can therefore be concluded that the core function of symbolic space is ‘stimulation’.

§ 2.4.2 MATERIAL SPACE

Material space is essential in facilitating creative clustering. As has been specified in the section on the microscale of a creative cluster, many of the impacts of material space on creative clusters go through social processes or through psychological values. However, there are material or physical characteristics of space that have a direct impact on creative clusters. One obvious impact is literally the supply of cheap space. Low rents in old and derelict industrials buildings, decrease on the one hand the barrier of entry, while on the other hand facilitating experimentation of very small firms. The latter contributes to the innovativeness of a creative cluster.

Next to the provision of space, the old buildings seem to offer certain physical characteristics. High ceilings, high doorways, and large open spaces lend themselves well for adaptive reuse of spaces. These characteristics are part of the districts’ visual form and are therefore part of the material space. Smit (2011) concludes that there is a significant relationship between the visual quality of a cluster and the locational behaviour of creative entrepreneurs. This has a strong link to the symbolic space, as the visual form contributes to the increased creative production. Creative entrepreneurs can thus use their choice where to locate themselves to
steer their quality of work. Rantisi and Leslie have specified that material space provides the conditions for creative practises. It gives space to experimentation, and thus the material factors nurture the creative dispositions. This is done by on the one hand removing the pressure with low rents and on the other hand with flexible spaces to fit the dimensions of creative work (Rantisi & Leslie, 2010). The way the materiality of certain locations can nurture creative production, the core function of the material space is clearly ‘facilitation’.

§ 2.4.3 SOCIAL SPACE

As is implicit in the nature of the creative clusters, the social practises are a critical part of the work. The networks that are created between individuals and firms, are crucial in transmitting information and knowledge. By doing so, these social networks are full of ‘buzz’. Therefore, the social space is the network, where the ‘buzz’ manifests itself by connecting everyone. This space has strong links with material space because people often meet face to face. The places where that happens, both deliberate and undeliberate, are the social spaces. Elements of the material space are facilitators for the social space. Small grain size, pedestrian friendly and permeable streetscapes, and direct links between interior and exterior all contribute to (possible meaningful) encounters in a creative cluster.

Local buzz, as originally developed by Storper and Venables (2004), is one of the three types of interactions distinguished by Bathelt, Malmberg, and Maskell (2004). The other two are global pipelines and temporary clusters. Global pipelines are channels of interaction between businesses in different clusters and have a more planned character. Temporary clusters emerge when representatives of businesses or institutions take part in events, like congresses or conventions.

For the social meaning of space, the local buzz type of interaction is the most relevant because it can be facilitated by pleasant and inspiring meeting places. But even the most pleasant and inspiring place will not cause people to interact spontaneously. Van der Hee and Romein (2015) propose to provide a stimulation for conversation by placing striking objects. This object will attract the attention and can be the starting point of a conversation between strangers. This example shows a way where different meanings of space overlap. The striking object that functions as a conversation starter, is simultaneously the stimulating environment of the symbolic meaning of space. Another effect of these objects is the appropriation of space, as described by Costa and Lopes (2015). This means the way public space is ‘taken over’ by the people to use it their way; thereby creating their own social networks.

In spite of the complex and intangible nature of human interaction, the social space is simply all about connection, and the spatial elements that provide it.
\section{ECONOMIC SPACE}

Economic space are those spaces where the creative production happens. It results largely from the agglomeration economies mentioned on the mesoscale level. There is a large body of literature on the economic benefits of clustering, showing that the factors for clustering extend far beyond those of urban form. Based on the cluster concept from Porter (1998), firms concentrate geographically for three reasons: They have a pool of skilled labour at their disposal, the presence of supporting and ancillary trades, and for the availability of various other firms in the field of specialization. But, creative clusters are not randomly distributed. Previous studies (Currid, 2007; Pratt, 2002) have shown that place and specific spatial conditions matter for the operation of creative industries.

Specific for the creative industries are its different work patterns (see §2.2 on the cultural economy). The research of Martins (2015) looks into the ways the built environment can support these work patterns. She has found that work activities unfold in multiple settings, not just the office. There is a base, often the residence of the office, and an 'extended workspace' in ancillary spaces, such as coffee shops and parks. Both the base and the ancillary spaces are considered economic spaces.

Economic space is all about the locations of creative production.
Figure 7 The theoretical framework consisting of four elements: the global trend; the key drivers; the three scale levels; and the four meanings of space.
Theoretical framework

§ 2.5 CONCLUSION: SPATIAL ELEMENTS FROM THEORETICAL FRAMEWORK

The first chapter of this research has resulted in a theoretical framework that unravels the spatial features of creative clusters. It therefore answers the question: what are the spatial features of creative clusters in a theoretical context?

The theoretical framework is constructed around four factors: one global trend, two drivers, three scales, and four meanings of space.

The global trend is the background of creative clusters. It is the influence on the larger scale of the cultural economy that is present throughout the world at this moment. New ways of working, living, and visiting have shaped the new ways of producing products and services. This new balance between consuming and producing is clearly visible in creative clusters.

The two key drivers of creative clusters are creativity and innovation. Both creativity and innovation are individual and interactive processes that can have the power to shape cities. But in the case of the creative industries, it is the combination of creativity and innovation that causes the clustering to happen. As the large body of literature shows, space and place are intertwined with the economic processes.

Creative clusters tend to operate on three scales: the macro scale of the region; the mesoscale of the cluster itself; and the microscale of the collective. The region can support or cause creative clusters by means of institutions like universities or research centres. On the level of the cluster, there are the positive externalities that arise from clustering. The microscale of the cluster is construed as the indispensable human interactions. These face-to-face contacts create buzz and stimulation.

The four meanings of space are a new way of looking at the spatial elements in creative clusters. It is the multiplicity of space through four meanings: economic space being the spaces where creative production takes place; social space being the places where networks and encounters are established; material space offers the flexibility that is needed to nurture creativity and innovation; and the symbolic space that stimulates the sense of identity and authenticity.
In this chapter the new method based on the theoretical framework will be introduced as an answer to the second sub research question: “How can the spatial features of creative clusters be applied in an urban design method?”. The Method for Analysing Space and Defining Potential consists of different steps that each will be discussed in the following sub sections. It will start however with describing the outline of the method in §3.1. The three steps of the method will be discussed in the subsections §3.2, §3.3, and §3.4. This chapter will end with a conclusion in §3.5 that will provide the answer to the second sub research question.
§ 3.1 OUTLINE OF THE METHOD

Steps in the MASDP
A new method for dealing with interventions in creative clusters is proposed: The Method for Analysing Space and Defining Potentials (the MASDP, see figure 8). The proposed Method for Analysing Space and Defining Potentials comprises three steps that will be shortly explained in the following, and a more elaborate description can be found in the remaining of this chapter.

The first step of the MASDP is called analysis and deals with the mapping of the cluster. It is used to acquire the relevant data on which the decisions later on will be build. This step starts off at the level of the cluster and ends at the level of the collection. This collection is the result of the analysis and is the working region in which interventions are needed.

The second step of the method is called action and revolves around the current and potential values of the four meanings of space. It begins at the level of the collection and ends at the smallest level of the container. The result of this step are the potential values of the four meanings of space for each container of the collection.

The third and last step of the MASDP is called adaption and is used as a reflection on all the scale levels. It starts with balancing the potential values so that interventions can be proposed. It ends at the largest scale of the cluster, where the effects of the interventions can be mapped.

Relevance
There are several well established schools of typo morphological urban analysis (Moudon, 1994) and urban designers are well suited to define potentials themselves. Which raises the question as to the relevance of this proposed method. There are two reasons why this new method is needed.

First, analysing space in creative clusters deals not solely with morphological aspects. Typomorphology, as "the study of urban form derived from studies of typical spaces and structures" (Moudon, 1994), reveals the physical and spatial structure of cities. In other words, it shows the tangible aspects of space. But, as has become clear in the theoretical framework, the form of space (morphology) is closely intertwined with the intangible aspects such as the economic, social, and symbolic meanings of space. Therefore, a method is needed that makes both the tangible and intangible the role of space in the functioning of creative clusters clear.

Secondly, in order to use these intangibles in urban design, a translation into practical knowledge is needed. The defined potentials make the issues at hand clear for urban designers. They are tools to better understand the impact of the role of space. Therefore, the defined potentials show how intervening in space can influence creative clusters.

Components of the MASCP
The proposed method uses a specific terminology for certain scale levels and introduces a new way of looking at public space. These components will be explained in the following, starting with the scale levels.
Figure 8 The three steps of the Method for Analysing Space and Defining Potential: analysis; action; adaptation.

Figure 9 The three scale levels of the MASDP: the cluster, the collection, and the container.
Spatial elements in creative clusters

The MASDP covers the mesoscale as described in the theoretical framework. Within the method, there are three scale levels used. The largest scale is that of the cluster and is the same as the mesoscale. The smallest scale is a piece of public space that is defined by building façades or other structures, for example a crossing street, or a fence. One such piece is called a container, because it contains the public space and its spatial elements that matter for creative clusters. In the MASDP an intermediate scale is used as well, the collection. A collection is a set of bordering containers. An overview of these scale levels can be found in figure 9.

The act of taking a piece of public space and forming a ‘box’ of empty space, is a new way of looking at public space. It is to some extent based on the concept of a Nolli map. The Nolli map was the first map to make the distinction between public and private space, showing also the interiors of churches since they are also publicly accessible (Nolli, 1748). The other examples of urban analysis that are used, are both from the French school of urban analysis (Van den Burg & Stolk, 2004). The ‘éléments d’analyse urbaine’ (Panerai, Depaule, Demorgon, & Verenche, 1980) have typical perspective drawings that show urban scenes, as can be seen in figure 10. The ‘lecture d’une ville’ (Castex, Céleste, Panerai, Burlen, & Furet, 1980), that
analysed the pavilions of Versailles, shows a similar section of the street (see figure 11). Both are highlighting that the street is much more than the blank space usually found on a map. This idea, of looking at the public space between facades has been adopted for the drawing of the container, the smallest unit in the proposed method. It takes the negative space, the blank or white spaces on a map, and sees it as its own volume. It can therefore be seen as the 3D negative space, bounded by its surrounding objects. These are context dependent, but can include objects like building façades, and blue or green structures.
§ 3.2  STEP 1 ANALYSIS

In this section the first step of the MASDP, analysis, will be explained fully. The analysis comprises two parts. Where the first part is gathering all the data for the cluster, the second part is using the data to understand in which state the cluster is in. For each part the components will be described and their relevance to creative clusters will be given.

§ 3.2.1  MAPPING CLUSTERS

Networks and diversity, in their broadest sense, form the base for creative clusters. They are used to organise the data that is going to be mapped in this part of the analysis, see figure 12. To “uncover realities previously unseen or unimagined” (Corner, 1999), mappings will be used to show these networks and diversity.

In order to say something about the networks in a cluster, both the creative industries and the walkability intensity will be mapped.

The creative industries are all the creative businesses in the area, sorted into five categories. These categories are visual arts (studios, galleries); performance (stages, events, live music, theatre); design (architecture, landscape, fashion, furniture); media (film, advertising, software, graphics); and mixed (business incubators, business complexes). These categories are used as a conceptual framework, to better understand the structures of the cluster.

To grasp the walkable connections, which can constitute a network, the walkability intensity maps are made. These maps are formed by lines connecting all activities closer than 400 meters as the crow flies. These 400 metres correspond roughly to a 5-minute walk. Potential face-to-face contact is represented here, showing a visual understanding of spatial clustering.

The diversity mappings are more focused on the morphological aspects of the cluster. The following subjects will be mapped: building height (in stories); building age (in appropriate periods); and lot size. The categories are derived from the work of Jacobs (1961) who realised the importance of diversity in her study to the then creative cluster of Greenwich Village. She had already called for a mix of old and new, a mix in density, and a mix in grain size (Wood & Dovey, 2015). Even though creative clusters cannot be reduced to their morphology, they are
Method for Analysing Space and Defining Potential

Intertwined with the morphologies of certain places. Therefore, the extent of morphological diversity in the clusters needs to be mapped.

§ 3.2.2 MIXING STRUCTURES

Mixing the mappings of the networks and diversities are needed as a framework to understand the link between everyday day life and the morphology of the city. Creative clustering can be seen as a form of socio-spatial assemblage, shaped simultaneously by people and spatial context. This assemblage is both the process of connectivity, and its assembled outcome (Wood & Dovey, 2015).

This assemblage consists mainly of three mixes: "Ultimately this is a mix of functional, formal and social mix – a mix of mixes." (Dovey, 2016). These mixes will be explained in the following.

The functional mix is self-explanatory: a mix of functions. The functional incorporates a mix of production, exchange, consumption, residential and recreational uses. Diverse functions enhance walkability and result in a vibrant street rhythm.

The formal mix is equal to the morphological mix and incorporates a mix of lot-size, building ages and building heights (Wood & Dovey, 2015). A diversity in lot-sizes enables a synergy between larger and smaller scales of production and consumption. A mix of building types and heights is correlated with a diversity in old and new buildings. As Jacobs (1961) mentions, a mix of new and old produces often a mix in high and low rent. The morphological mix enhances the diversity of activities and people in the cluster.

The socio-economic mix incorporates a mix of social classes, cultural values and rental values. The diversity in the socio-economic mix is fundamental to the vitality of the city (Dovey, 2016). It is also the type of diversity that can lead to self-destruction, as described by Jacobs (1961): a diverse neighbourhood is popular, therefore it attracts investments and redevelopments, decreasing its diversity and leading to the displacement of low rent uses and people. This phenomenon of gentrification is currently ubiquitous.
This mix of mixes are the interconnections and synergies between the function, the morphological and the socio-economic. It is important to keep in mind that these relations are reciprocal, not causal.

This is directly translated into the network and diversity mappings made previously. Therefore, a socio-economic mix and a morphological mix will be made for the cluster. As can be seen in figure 13, they are based on the mappings of the cluster. The functional mix is not part of this mix of mixes, because the scale of the functional mix too large. The synergies that arise from the functional mix are at play on the city district scale.

Looking at the mix of mixes made for the cluster, it shows the intensity of clustering within this cluster. It provides starting points to decide where interventions are needed. These starting points are for example a hole in the walkability intensity maps, correlated with accessible public space. Or changing housing prices at a diverse morphological site, which are the first signs of gentrification.

A region within the cluster is the end product of this step: the collection. This is a part of the cluster that needs interventions to develop the clustering or to prevent the self-destruction mechanism.
§ 3.3  STEP 2  ACTION

This section is centred around the second step of the MASDAP: action. The main task of this step is dealing with the space at the smallest scale level and translating the concepts from the theoretical framework into practice. This step is made up off two parts: interpreting spaces and defining potentials, which will be described in the following.

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Action</th>
<th>Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mapping clusters &amp; Mixing structures</td>
<td>Interpreting spaces &amp; Defining potentials</td>
<td>Balancing interventions &amp; Renewed mappings</td>
</tr>
</tbody>
</table>

**Questioning the space**
As was described in the theoretical framework, the space of a creative cluster can be seen as a multiplicity of four different meanings of space. The economic, social, material, and symbolic meaning of space each contribute to the functioning of a creative cluster. That is why the four meanings of space will form the base of understanding the role of space in creative clusters.
This step is situated at the interplay of the four meanings of space and the container. It can be seen as a way of questioning the space of the container.

**An objective and a subjective look**
This step consists of two parts, that both use the four meanings of space. The difference between them is the intention with which they are applied. Figure 14 shows the two different ways that the four meanings of space are used together with the container.
In the first part, interpreting spaces, the intention is making the current state as clear and objective as possible. In the second part, defining potentials, the intention is using the four meanings of space to inspire interventions. This difference in attitude is needed on the one hand to make the designer aware of the intricate relation between the functioning of the creative cluster and the spatial elements, on the other hand it functions as the starting point from which the designer’s own plan evolve.
§ 3.3.1 INTERPRETING SPACES

In the first part of this step, the current value for each of the four meanings of space is determined. This has to be done for all the containers in the collection, in order to interpret the space of each container. Before any intervention can be proposed, the current situation needs to be understood. This current value shows the spatial elements in the container that are influencing the four meanings of space.

To determine the current value of the four meanings of space, questions need to be answered about the container and its spatial elements. These questions are designed to give three possible values for each meaning of space, and are based on the theoretical framework that was made earlier in this thesis.

For each meaning of space these questions and their relation to the theoretical framework are explained in the following, the process of determining the current value concludes this section.

![Diagrammatic overview of the objective and subjective use of the four meanings of space.](image)
Method for Analysing Space and Defining Potential

For the economic meaning of space, the following categories are distilled from the theoretical framework: the functions of the container and the presence of extended workplaces. In order to get to these categories, a set of spatial concepts or spatial elements are defined from the keywords and the core function of the theoretical framework. In the case of the economic space these spatial elements are related to the functions which are present in creative clusters such as the creative industries and supporting services. They are also related to the different work patterns present in creative clusters and the corresponding spatial elements are the workplaces beyond the office and the residence. In figure 15 these spatial elements and their source from literature can be seen, as well as how they are categorised into ‘functions’ and ‘extended workplaces’.

The two categories are used to form two questions that, once answered, will provide an insight into the spatial elements of the economic meaning of space. The questions for this space are: “Are the functions of the container part of creative production?” and “Does the container have extended workplaces?”. They can be seen in figure 16.

**Economic space**

For the economic meaning of space, the following categories are distilled from the theoretical framework: the functions of the container and the presence of extended workplaces. In order to get to these categories, a set of spatial concepts or spatial elements are defined from the keywords and the core function of the theoretical framework. In the case of the economic space these spatial elements are related to the functions which are present in creative clusters such as the creative industries and supporting services. They are also related to the different work patterns present in creative clusters and the corresponding spatial elements are the workplaces beyond the office and the residence. In figure 15 these spatial elements and their source from literature can be seen, as well as how they are categorised into ‘functions’ and ‘extended workplaces’.

The two categories are used to form two questions that, once answered, will provide an insight into the spatial elements of the economic meaning of space. The questions for this space are: “Are the functions of the container part of creative production?” and “Does the container have extended workplaces?”. They can be seen in figure 16.
Spatial elements in creative clusters

For the social meaning of space, the categories ‘interactions’ and ‘encounters’ are derived from the theoretical framework. The spatial elements and concepts that have led to these categories are based on the keywords and the core functions from the theoretical framework. They are related to different types of connections that take place in creative clusters. The types of interactions are the different ways of exchanging ideas and information, whereas the types of encounters are the ways space can help in getting people together. In figure 17 these spatial concepts and their source from literature can be found, as well as how they are categorised into ‘interactions’ and ‘encounters’.

The two questions, as seen in figure 18, that result from these categories are: “Does the container encourage the exchange of ideas?” and “Is the container a meeting place?”. Once answered, they will highlight the spatial elements of the social meaning of space.
Material space

For the material meaning of space, the following categories are derived from the theoretical framework: the flexibility that the space offers and the visual qualities that are present. In order to get to these categories, a set of spatial elements and concepts has been formed, based on the keywords and core functions of the theoretical framework. In the case of the material space these spatial elements are related to the spatial characteristics that encourage experimentation. They are also related to the present materials and the way those inspire creative production. In figure 19, these spatial elements and concepts can be seen as well as their literature source and the way they are divided into ‘flexibility’ and ‘visual quality’.

The two categories are used to form the two questions that will highlight the spatial elements of the material meaning of space. These questions are: “Is the container flexible, in order to encourage experimentation?” and “Do the visual qualities of the container act as resources for creativity and innovation?”. They can be seen in figure 20.
For the symbolic meaning of space, the categories ‘distinction’ and ‘embedded history’ are distilled from the theoretical framework. The spatial elements and concept that have led to these categories are based on the keywords and the core function as presented in the theoretical framework. They are related to ways the visual character of the container is distinctive from its surroundings. They are also related to the ways in which the spatial elements of the container can ‘tell the history of a place’; how these spatial elements can represent the container’s past. In figure 21, these spatial concepts and their source form literature can be found, as well as how they are categorised into ‘distinction’ and ‘embedded history’.

The two questions, as seen in figure 22, that result from these categories are: “Can the overall visual character of the container be perceived as distinctive?” and “Does the container represent the embedded history of the locality?”.

**Symbolic space**

**Figure 21** Spatial elements of the symbolic meaning of space categorised.

**Figure 22** Questions and possible values for the symbolic meaning of space.

**Distinction**
Can the overall visual character of the container be perceived as ‘distinctive’?

**Embedded history**
Does the container represent the embedded history of the locality?

<table>
<thead>
<tr>
<th>Distinction</th>
<th>Embedded history</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES and YES</td>
<td>YES and NO</td>
</tr>
<tr>
<td>YES or NO</td>
<td>YES or NO</td>
</tr>
<tr>
<td>NO and NO</td>
<td></td>
</tr>
</tbody>
</table>
Method for Analysing Space and Defining Potential

Interpretation of space as current value

The four values together form the current value for the four meanings of space. As was shown in the figures 16, 18, 20, and 22, the two questions can result in three possible values per meaning of space. If both of the questions are answered with yes, the full value is given because the spatial elements are fulfilling their core function. If one question is answered with yes, and therefore one question is answered with no, the medium value is given. This means that some of the spatial elements are contributing to fulfilling the core function, but some are not. If both of the questions are answered with no, the low value is given. This means that none of the spatial elements are fulfilling the core function. The three possible values for each of the four meanings of space constitutes the current value of that container, as can be seen in the figures 24, 25, 26, and 27. In total there are 81 possible values that a container can have, as shown in figure 23.
Spatial elements in creative clusters

SO  Does the container encourage the exchange of ideas?  NO
SO  Is the container a meeting place?  NO

EC  Are the functions of the container part of creative production?  NO
EC  Does the container have extended workplaces?  NO

SY  Can the overall visual character of the container be perceived as distinctive?  NO
SY  Does the container represent the embedded history of the locality?  NO

MA  Is the container flexible, in order to encourage experimentation?  NO
MA  Do the visual qualities of the container act as resources for creativity and innovation?  NO

Figure 24 Options for answering the eight questions: low values.

SO  Does the container encourage the exchange of ideas?  YES
SO  Is the container a meeting place?  NO

EC  Are the functions of the container part of creative production?  YES
EC  Does the container have extended workplaces?  NO

SY  Can the overall visual character of the container be perceived as distinctive?  YES
SY  Does the container represent the embedded history of the locality?  NO

MA  Is the container flexible, in order to encourage experimentation?  YES
MA  Do the visual qualities of the container act as resources for creativity and innovation?  NO

Figure 25 Options for answering the eight questions: medium values.
**Method for Analysing Space and Defining Potential**

<table>
<thead>
<tr>
<th>Question</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the container encourage the exchange of ideas?</td>
<td>NO</td>
</tr>
<tr>
<td>Is the container a meeting place?</td>
<td>YES</td>
</tr>
<tr>
<td>Are the functions of the container part of creative production?</td>
<td>NO</td>
</tr>
<tr>
<td>Does the container have extended workplaces?</td>
<td>YES</td>
</tr>
<tr>
<td>Can the overall visual character of the container be perceived as distinctive?</td>
<td>YES</td>
</tr>
<tr>
<td>Does the container represent the embedded history of the locality?</td>
<td>YES</td>
</tr>
<tr>
<td>Is the container flexible, in order to encourage experimentation?</td>
<td>NO</td>
</tr>
<tr>
<td>Do the visual qualities of the container act as resources for creativity and innovation?</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Figure 26** Options for answering the eight questions: medium values.

<table>
<thead>
<tr>
<th>Question</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the container encourage the exchange of ideas?</td>
<td>YES</td>
</tr>
<tr>
<td>Is the container a meeting place?</td>
<td>YES</td>
</tr>
<tr>
<td>Are the functions of the container part of creative production?</td>
<td>YES</td>
</tr>
<tr>
<td>Does the container have extended workplaces?</td>
<td>YES</td>
</tr>
<tr>
<td>Can the overall visual character of the container be perceived as distinctive?</td>
<td>YES</td>
</tr>
<tr>
<td>Does the container represent the embedded history of the locality?</td>
<td>YES</td>
</tr>
<tr>
<td>Is the container flexible, in order to encourage experimentation?</td>
<td>YES</td>
</tr>
<tr>
<td>Do the visual qualities of the container act as resources for creativity and innovation?</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Figure 27** Options for answering the eight questions: high values.
DEFINING POTENTIALS

In the second part of this step, the potential value for each of the four meanings of space is defined. This has to be done for all the containers in the collection, in order to grow as a creative cluster. The defined potentials form the inspiration, or starting point for the urban designers. It can be seen as a ‘hidden reality’ that can come forward with the interventions from the designers.

To determine the potential of the four meanings of space, the spatial elements from the theoretical framework are being used, plus the inspiration from a designer. The spatial elements can guide the designer to go from the current value to fulfilling the core function of each meaning of space.

This process, starting from the current value and using the four meanings to define the potential, will be discussed below.

The definition of potential is the description of how the container can fulfil the core function of each meaning of space. In other words, what needs to be done to get the full value and in result answer all the eight questions with ‘yes’. The starting point of defining the potentials is the current value given in the first part. In figure 28, this value for the container is positioned in the centre. From there it is up to the designer to end up at the core function of each meaning of space.

For the economic meaning of space this means that the questions dealing with the functions and the workspaces need to be answered with yes. The given spatial elements provide possibilities for doing that. But in the end, it is all about production.

For the social meaning of space, it means that interaction and encounters need to be provided for. Here the spatial elements provide options for doing that. What matters most is that the proposed interventions for the social meaning of space deal with connection.

For the material meaning of space this means that the questions dealing with the flexibility and experimentation need to be answered with yes. The spatial elements are given here as well. The main objective of interventions in the material meaning of space is fulfilling the core function of facilitation.

For the last meanings of space, the symbolic meaning, it means providing for interventions dealing with distinction and history. The spatial elements from the theoretical framework provide ideas to start with. But in the end, it is all about stimulation.
Figure 28 Using the four meanings of space to define potentials.
§ 3.4  

STEP 3: ADAPTATION

In this section, the third and last step of the MASDP will be elaborated on. The step is called ‘adaptation’ and its main tasks are balancing the interventions and reflecting upon them. It uses the collection of the containers with all the potentials made in the previous step as the starting point. In the end, this step is back at the scale of the cluster, reflecting on the change made by the interventions.

§ 3.4.1  

BALANCING INTERVENTIONS

Balancing the interventions is about choosing the suitable ones for each space and the collection as a whole. As has been stated before in the section on mapping diversity, a mixture of almost all aspects are of vital importance to a creative cluster. Therefore, it would be illogical to apply the full potential in all the containers in the collection. That would result in several spaces that all have a landmark, that all spaces at the same time are flexible meeting spaces with an enormous amount of creative businesses. In order for the interventions to work, and to make sensible use of the four meanings of space, balancing the proposed interventions is essential.

There are two ways of determining these proposed changes that can stay: the internal and external constraints.

The internal constraints mean that the container and its spatial elements itself, have certain characteristics that steer the interventions. For example, the presence of a business complex with creative companies that has a low value for material space, will prioritise the fulfilling of the material space. Another instance can be a container that is the only one in the collection that has the potential for the full development of symbolic space, that intervention should be completed. The internal constraints ensure that only one intervention is possible.

The external constraints are imposed by the characteristics of adjacent containers, or by the interventions proposed in adjacent containers. The latter is often because those containers had internal constraint themselves. For example, a container is located next to a high valued symbolic space, and is connected to public transportation modes that connect the cluster to the rest of the city. This will guide the development of that container towards the development
of a high valued social space, in order to support the adjacent symbolic space. By means of external constraints, some interventions are made impossible because of the adjacent containers.

If there should remain multiple intervention possible for a container, the diversity of the collection should be kept in mind.

§ 3.4.2 RENEWED MAPPINGS

The second part of the step Adaptation, and the final part of the MASDP, is reflecting on the interventions. Since at the end of the previous step, the interventions are defined, it can be seen as a detached step in the method. This is partly true because the interventions will not be changed and nothing will be added. This part is about considering the development of the cluster and how it can be steered.

This is done by remaking the maps from the analysis. This should be done after the interventions have been implemented or built, and are taken in by the community. Only then can the effects properly be seen. It is expected that the interventions will have some sort of catalysing effect, but that is inherently unpredictable. The renewed mappings can thus only be made after a considerable amount of time.

Since the purpose of the interventions is to strengthen the cluster, it is probable that the mappings will show a tighter network between creative industries, or an expended cluster. By comparing these mappings with the mapping from the analysis previous to the interventions, the localities affected by the interventions can be spotted.

This reflection is very useful to ‘measure the success’ of the interventions, but also to spot the (early) signs of a cluster that ‘functions too well’. The most obvious effect is that of gentrification as a result of a cluster being subjected to too much success. This can be seen in the mappings by a loss of diversity and might therefore be a reason to start the method again.
CONCLUSION: PROPOSED METHOD FOR ANALYSING SPACE AND DEFINING POTENTIAL

To be able to use the insights of the four meanings of space in practice, a method is developed that translates the theoretical knowledge into applicable tools: The Method for Analysing Space and Defining Potential. This is the answer to the second sub question: how can the spatial features of creative clusters be applied in an urban design method? The proposed method consists of three steps that operate on three different scale levels within the creative cluster.

Analysis is the first step and analyses the aspects that matter to the space of creative clusters and looks at the morphological mix and the socio-economic mix. This step starts at the level of the cluster and end one level smaller, with the marking of a collection. This collection is the focus of attention.

Action is the second step uses the four meanings of space from the theoretical framework. It starts with the collection from ‘analysis’ and uses the containers to execute this step. The container is the smallest scale and is a new way of looking at public space. It is a visualisation of the 3D negative space; the space that is usually left blank on a map. It uses the four meanings of space to interpret the space and to define the potential for each of these containers.

Adaptation is the third and last step of the method. It balances the internal and external constraints of each container to come to the best coherence of interventions for the collection as a whole. The changes in the collection, after implementation of the chosen interventions and their integration in the cluster, can be seen in the same maps that were made to analyse the cluster to begin with. Renewing these mappings acts as a form of reflection on intervening in creative clusters.
In this chapter the Method for Analysing Space and Defining Potential will be applied as an illustration of the method. It will show the three different steps of the method, applied in a developing creative cluster in Rotterdam (NL). Firstly, this area, an inner-city harbour called M4H, will be introduced. Its characteristics as former fruit port turning into creative cluster are being described in §4.1. In the following section the first step of the method will be discussed. The mappings for the analysis will be made for this area (see §4.2). The following section, §4.3, deal with the second step of the method: action. Two established clusters will be used next to the developing cluster of M4H to interpret the space and define the potential for M4H. The last step of the method, adaptation, will be dealt with in §4.4. This section will show how the intervention for a container is chosen based on its context. This chapter will end with the concluding §4.5, in which the third sub research question “Can the urban design method be applied in the Merwe-Vierhavens area to stimulate the development of a creative cluster?” will be answered. This section will also discuss some lessons that can be drawn from the application of the method.
§ 4.1 INTRODUCING THE CREATIVE CLUSTER IN M4H

The Merwe-Vierhavens (M4H) are part of Rotterdam’s inner-city harbours (figure 29). Completed in 1930, it is the only harbour from that time that is still used in Rotterdam. From the beginning, it was used for the handling of goods in fruit. Today, it is one of the biggest fruit ports in the world. But, with the harbour going west more and more, the inner city harbours of Rotterdam are undergoing the biggest act of urban renewal in the Netherlands (Rijksoverheid, 2015). The Merwe-Vierhavens also will in the future lose its fruit-port function to the south bank, clearing out space for new programs.

This transition is visible in at least two ways. Firstly, there are the actions and promotions from the municipality, and secondly there are the physical transitions. The city of Rotterdam and the Rotterdam Port Authority have teamed up with private parties to “create special, innovative living and working […], thus reinforcing the economic structure of the city and the port.” (Stadshavens Rotterdam, 2008). This ambition for the renewal of the harbour areas, covers four harbours: RDM Heijplaat and the Waal-Eemhaven on the south bank, the Rijn-Maashaven near the city centre, and the Merwe-Vierhavens. The Stadshavens Rotterdam has a clear focus for the Merwe Vierhavens area: “Stoere havengebouwen, fraaie vergezichten over het water en bedrijvigheid van nieuwe ondernemingen: de energie stroomt door de Stadshavens Rotterdam. Ondernemers die ruimte zoeken om te experimenteren, te vernieuwen en door te groeien zetten voet aan wal in M4H.” [Cool port buildings, beautiful sights over the water and activity from new businesses: energy is flowing through the Stadshavens Rotterdam. Entrepreneurs who seek space to experiment, to innovate, and to grow go ashore in M4H] (Stadshavens Rotterdam, 2015).

Physically the transition is visible through a mixture of harbour activities, small entrepreneurs (whether or not attracted by the campaign), and regular city living. This area is characterised by warehouses and trucks, but also by artists like Daan Roosegaarde2 and Atelier van Lieshout3, and in between those, the ‘regular citizens’ doing their shopping at Albert Heijn. It is by any means an area buzzing with activity, as can be seen in the figures 30, 31, 32.

Within this peculiar mix of activities, a creative cluster is developing. There are several start-ups, business complexes with creatives in the maker industry, and a restaurant that uses its own produce. See the figures 33, 34, and 35 for impressions of these creative industries in M4H.

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2 https://www.studioroosegaarde.net/projects/#beyond
3 http://www.ateliervanlieshout.com/
Figure 29 Satellite overview of the M4H area.
Figure 30 Warehouse of the Rotterdam Fruit Wharf.

Figure 31 Backyard of artist Atelier van Lieshout.

Figure 32 Regular chain shops.
Figure 33 A start up from the M4H cluster: Snijlab.

Figure 34 The Keilewerf, a business complex for creative makers.

Figure 35 Restaurant that uses its own produce: ‘Uit je eigen Stad’.
Figure 36 MASDP, the first step Analysis highlighted.

Figure 37 Overview of the subjects to be mapped.
§ 4.2  ANALYSIS OF THE M4H

In this section, the first step (as portrayed in figure 36) of the method will be conducted. The highest scale level, the cluster, is the M4H area. The analysis will be done on that location. The first part of this step, mapping clusters, will be dealt with in §4.2.1. The second part of this step, mixing structures, is discussed in §4.2.2. The outcome, where the collection is chosen from the cluster, is shown in §4.2.3.

§ 4.2.1  MAPPING CLUSTERS

The subjects as shown in figure 37 will be mapped in this section. There are grouped in two: mapping the networks, comprising of the mappings of creative industries and the walkability intensity; and mapping the diversity, comprising mappings of building height, building age, and lot size. The explanatory text will follow below; the mappings are shown on the next pages.

Mapping networks
In the map showing the creative industries, there are relatively many business complexes. This could be explained through the generally large buildings in the area. It might be easier for small companies to start in a business complex. It is also shown that most of the creative industries are located closer to the city centre, in the north-eastern corner of the map. Next to the proximity to the city, there is also a transport node of public transport present. In the map of the walkability intensity, there is clearly one cluster visible where most of the business are located. But in north-western corner, a small cluster can be seen. This is thinly connected to the main cluster.

Mapping diversity
The building height mappings show that most buildings in the area are low and medium rise buildings. There is one cluster of high rise, these are the Marconi towers. They are landmarks in the area, built in the 70's. The many amounts of low and medium rise buildings correspond with its function as harbour.

The building age mappings show a few buildings from the period before 1945. These will be buildings from the period that the harbour was constructed, around 1930. The majority of the buildings date from the period 1945-2005, which relates to when the harbour was in full use. The lot size mappings show a direct link with the building age mappings. The small lots are mostly the older buildings. When the harbour grew, the warehouses got bigger simultaneously. Especially for a creative cluster these are rather big lots. This might also be an explanation for the relatively high amount of business complexes as mentioned before.
Figure 38 Map showing the creative industries of the cluster.
Application of the MASDP
Figure 39 Map showing the walkability of the cluster.

Legend

- < 400 meter
- = 5 min. walk

North
Application of the MASDP
Figure 40 Map showing the building height of the cluster

Legend
- 1 - 2 stories
- 3 - 5 stories
- > 5 stories

North
Figure 41 Map showing the building age in the cluster.
Figure 42 Map showing the lot size in the cluster.
§ 4.2.2 MIXING STRUCTURES

In this part of the step, the mappings from the first part of the step will be used to point out structures in the cluster. The explanatory text will be given below; the corresponding maps are on the following pages.

Socio-economic mix
The socio-economic mix is derived from the present creative industries and the walkability intensity between them. There are two mappings made, the first showing the ‘clusters’ per creative industry. This means a cluster for visual arts, a cluster for media, a cluster for design, and a cluster for performance. The second shows a mapping made from the business complexes. Since they have mixed companies, their network extents to the business within their 400-meter range. The first map shows that there is no clear focus in the cluster. There is no dominant industry, and the industries themselves are quite isolated. From the second map is becomes apparent that the business complexes are the glue in this cluster. They form the connections between the separate creative industries.
Figure 43 Mapping showing the clustering of the creative industries.
Figure 44 Mapping showing the clustering of the business complexes.
§ 4.2.3 FROM CLUSTER TO COLLECTION

This sub section deals with choosing the collection, based on the results of the analysis. It will therefore start with a short conclusion of the analysis, followed by the objective of developing this cluster. It continues by describing three conceptual ways in which this development can be reached. This section ends with the choice for one of these ways and the resulting collection.

Based on the results of the analysis this cluster can be seen as two sub clusters with some creative activity happening in between them. In figure 45, these results are diagrammatically displayed. The terms cluster and sub clusters are used here to differentiate between the notion of scale in this method and the results from the analysis. The term cluster refers to the whole area that is analysed and the term sub cluster refers to the actual clustering of creative industries that takes place in this location. As shown in this figure, the top cluster is relatively strong based on the proximity of present creative industries. The bottom cluster is much weaker but is still seen as a sub cluster because of the presence of several business complexes. This results in a very small and localised network of creative industries, but a network nonetheless. The dots in the middle are the remaining creative industries in this cluster that are too low in numbers to form a sub cluster. This notion of two sub clusters and some activity in between them forms the basis on which the choice for the collection will be made.

Reasons for and importance of clustering

The economic advantages of clustering are known for over a century: the ready supply of labour, the shorter distances along the production supply chain, and the collective attraction of multiple competitors delivering a large customer base. These can be seen as agglomerative effects. But there are more agglomerative effects at play in creative clusters: network effects and density effects. The density effects of agglomeration are the shortened distances and an increased ease of face to face contact. Also, the frequency of spontaneous encounters in the public space increases. The network effect of agglomeration relates to the added value caused by network interactivity. The value of each node (new and existing) in the network increases as the network grows when new nodes are added. So, each new node (a business in the creative industries) adds value to all the existing nodes of that network.

So, based on these agglomerative effects, it is clear that a cluster can become successful by intensifying and enlarging its clustering.

Turning back to the case of M4H, these agglomerative effects set the goal for the cluster. The two sub clusters need to merge into a big cluster. An interpretation of this big cluster, containing all present creative industries, can be found in figure 46.

Now that the goal of a whole cluster has been defined, there are several ways of reaching that goal. These ways can be seen as conceptual ways of developing the cluster. Three of these concepts will be highlighted in the following.
Three concepts for cluster development

The three conceptual ways of developing the big cluster are based on the existing sub clustering.

The first conceptual model focusses on the more intense clustered top cluster, see figure 47. It assumes that the top sub cluster will eventually develop into the direction of the bottom sub cluster.

The second conceptual model focusses on the less intense clustered bottom cluster, as shown in figure 48. This concept assumes that it is needed to get this sub cluster bigger and more intense and that the top sub cluster has enough strength to develop on its own. In the end, both sub clusters will merge into the intended big cluster.

The third conceptual model focusses on the few creative industries in between the sub clusters, as can be seen in figure 49. It assumes that the distance between the two sub clusters should be shortened, in order for the development into the big cluster to take place. By creating a third sub cluster, the linkages that are needed to connect the sub clusters can be made more easily.
Focussing on the missing link: defining the collection

Out of the three conceptual ways of developing the M4H cluster, one way is chosen to use in the application of the method. Based on the early state of clustering throughout the whole cluster, it is presumed that the existing sub clusters have enough ‘power’ to attract more creative industries to them. However, it might not be sufficient to let the two sub clusters grow all the way to each other. Therefore the third concept, focussing on the few creative industries between the sub clusters, is chosen as the way to reach the goal of a big cluster. In figure 50, the preliminary application of this concept on the cluster is shown. It displays the focus of the development; the existing creative industries that will act as the link between the two existing sub clusters. The collection, the scale level that is used in the following steps of the method, will naturally be the area that has just been described. The chosen collection consists of eight containers as can be seen in figure 51. In the following section, one of these containers will be picked to show the next step of the method.
Legend

- Collection
- Sub clusters
- Goal clusters
- Developing direction
- Existing industries
- North

Figure 50 Preliminary application of the development; showing the goal and direction.
Figure 51 Chosen collection with its eight containers.

Figure 52 The MASPD with the second step highlighted: action.
§ 4.3  ACTION: USING THE FOUR MEANINGS OF SPACE

In this section, the second step of the MASDP will be discussed. This step deals with the interpretation of space and the definition of potential for the containers of the collection (see figure 52). For the purpose of illustrating the MASDP, one container from the M4H area will be highlighted, instead of all eight containers that make up the collection. In this section, two containers from two established clusters in the Netherlands will be introduced as well. They function as precedent project to learn from for the M4H case. In sub section §4.3.1 the three containers will be introduced. In the following sub section §4.3.2, the interpretation of space will be given for all three containers. The last sub section of this section, §4.3.3, deals with defining the potential for the container in the M4H area.

§ 4.3.1  INTRODUCING THE CONTAINERS AT M4H, STRIJP-S, AND NDSM

In this subsection, three containers will be introduced. They will be used in the next subsection for the interpretation of space. In this way the context for the first part of the second step will be shown. The three containers are chosen to highlight the difference between developing and established clusters. Therefore, one container from the M4H collection is used, as well as two containers from two established clusters in the Netherlands. These clusters have a different background, but are both successful and can be seen as precedent projects for this thesis.

The M4H cluster and its subsequent collection have been described in the previous section, but the two other cluster not. In order to place these containers, the two cluster will be introduced first by providing a short history and description of its characteristics. On the following pages (figures 56 — 66) each container will be introduced, using the following elements:

• The location of the cluster and container
• A drawing of the container in question
• Four pictures showing elements from the four meanings of space
• An overall picture of the container.
STRIJP-S IN EINDHOVEN (NL)

History
Strijp-S is the former production site for the lightbulbs of Philips. The first factory was built in 1916 and it provided the glass for Philips. Subsequently a carton factory, a gas factory and a physics laboratory were built for the development of new techniques. From 2000 onwards, the first ideas are popping up to reuse the old industrial site. Philips has by then left Eindhoven for Amsterdam and other location in the world. The departure of Philips, which has created Strijp-S in the first place, shaped the possibilities for pioneers from the creative sector. Redevelopment plans are made and in 2004 Strijp-S is sold to VolkerWessels and the municipality of Eindhoven. In 2006 the first buildings are being demolished and new entrepreneurs locate themselves in the old Philips buildings.

Characteristics
The Strijp-S terrain consists of a collection of buildings, just outside the city centre of Eindhoven. All these buildings were used in the production of Philips lightbulbs and had their own function. The ‘Klokgebouw’ was used for the actual production of the lightbulbs. The ‘Veemgebouw’ was built for the storage of the products. As ancillary buildings, there were a machine room (see figure 53) and a kettle room. The whole process of making a lightbulb, from source material to the transportation to clients, happened on this Strijp-S terrain. As a result, the remaining buildings all have their unique characteristics that are reminders of their original use.
NDSM IN AMSTERDAM (NL)

History
The NDSM wharf is the former shipyard located in Amsterdam North, along the river IJ. The Nederlandsche Scheepsbouw Maatschappij [Dutch Shipbuilding Company] moved to this location in 1922 to build their freight- and passenger ships. In 1946 the company fused with the Nederlandsche Dok Maatschappij [Dutch Dock Company] and the new company, called the NDSM, started to build super tankers. Around the 1950’s this was the largest shipyard in Europe. In 1984 the company went bankrupt, and the site became the scene for drugs and prostitution. In the late 1990’s a couple of artists took over the wharf and started an incubator together with the municipality. In 2007 the artists and a growing body of users started to redevelop the large warehouse.

Characteristics
The NDSM terrain consists of an ensemble of buildings, of which the NDSM warehouse is the largest. In this warehouse, the users have built a so called ‘Art city’, by keeping as much possible of the old structures, as can be seen in figure 54. This art city accommodates nearly 200 creatives, twelve big theatre work spots, one of the highest rated indoor skate ranks in Europe, and several cafés and restaurants on the surrounding grounds. On the NDSM wharf there are two big ramps as well, that were used to launch the ships. The well-kept warehouse together with the ramps make it an easy to read terrain. Therefore, it was declared a national monument status in 2007.
INTRODUCING THE M4H CONTAINER: MARCONI QUAY

Figure 55 Drawn impression of the Marconi container.

Figure 56 Showing the container in the cluster.
Figure 57 Pictures showing the spatial elements per meaning of space.

Figure 58 Picture showing an overview of the Marconi container.
INTRODUCING THE STRIJP-S CONTAINER: DE ONTDEKFABRIEK
Figure 61 Pictures showing the spatial elements per meaning of space.

Figure 62 Picture showing an overview of the Ontdekfabriek container.
INTRODUCING THE NDSM CONTAINER: CAFÉ NOORDERLICHT

Figure 64 Maps showing the location of the cluster (left) and the container (right).

Figure 63 Drawn impression of the Noorderlicht container.
Application of the MASDP

**Figure 65** Pictures showing the spatial elements per meaning of space.

**Figure 66** Picture showing an overview of the Noorderlicht container.
§ 4.3.2 INTERPRETING THE SPACES

In this subsection the interpretation of space is given for the three container. Hereby completing the first part of the second step of the MASDP. This subsection will focus on the spatial elements in the containers that are part of the four meanings of space. These spatial elements are then used to determine the current value of the container. This is done with the eight question presented earlier in this thesis. Since this chapter revolves around the application of the MASDP in the M4H area, those spatial elements will be accompanied with an explaining text below. On the following pages (figures 67 — 75), the interpretation of space consists of the following elements:

- A diagrammatic representation of the spatial elements per meaning of space
- All spatial elements combined in a large diagram
- The eight questions with their answer; the resulting current value

Spatial elements determining the current value in M4H

- Economic meaning of space: ‘de fruitvis’ is an event location that incorporates the history of the location as a fruit port. It is used for meetings, parties, and as a stage. The sides of this container are divers: an object involved in creative production (de fruitvis); a quay with a beautiful view on the harbour; the road as access to the area; and a view on the Marconi towers, landmark of the cluster. However, there is only one object in creative production, therefore the value for economic space is medium.

- Social meaning of space: at the side of the quay there is an attempt made with the stone benches to create a social space. Since these benches are fixed in their usage, they do not encourage appropriation. Also the road, that serves a continuous flow of trucks to the Rotterdam Fruit Wharf, brings down the value of this container as social space. The low value is therefore given.

- Material meaning of space: the inflexible parking lot is a barrier on the street. It prevents easy contact from the symbolic space, the view, and the possible social space, the quay, to the economic space of de fruitvis. Thus, the low value is given to this meaning of space.

- Symbolic meaning of space: there is no landmark in this container, but there is the view on the harbour. Facing the south, it offers a look on the Maas river and its ships. Given the ‘harbour identity’ of this place, a medium value is given to the symbolic space.
Spatial elements in creative clusters

Figure 67 Spatial elements sorted by meaning of space.

DETERMINING THE CURRENT VALUE OF MARCONI QUAY
Figure 68 Spatial elements sorted by meaning of space.

Figure 69 Answering the eight questions, resulting in the current value.

SO Does the container encourage the exchange of ideas? NO
SO Is the container a meeting place? NO

EC Are the functions of the container part of creative production? YES
EC Does the container have extended workplaces? NO

SY Can the overall visual character of the container be perceived as ‘distinctive’? NO
SY Does the container represent the embedded history of the locality? YES

MA Is the container flexible, to encourage experimentation? NO
MA Do the visual qualities of the container act as resources for creativity and innovation? NO
Figure 70 Spatial elements sorted by meaning of space.

DETERMINING THE CURRENT VALUE OF DE ONTDEKFABRIEK
Figure 71 Spatial elements combined.

Figure 72 Answering the eight questions, resulting in the current value.

SO Does the container encourage the exchange of ideas? YES
SO Is the container a meeting place? YES
EC Are the functions of the container part of creative production? YES
EC Does the container have extended workplaces? YES
SY Can the overall visual character of the container be perceived as ‘distinctive’? YES
SY Does the container represent the embedded history of the locality? YES
MA Is the container flexible, to encourage experimentation? YES
MA Do the visual qualities of the container act as resources for creativity and innovation? YES
DETERMINING THE CURRENT VALUE OF CAFÉ NOORDERLICHT

Figure 73 Spatial elements sorted by meaning of space.
Figure 74 Spatial elements combined.

Figure 75 Answering the eight questions, resulting in the current value.

SO Does the container encourage the exchange of ideas? YES
SO Is the container a meeting place? YES

EC Are the functions of the container part of creative production? YES
EC Does the container have extended workplaces? YES

SY Can the overall visual character of the container be perceived as ‘distinctive’? YES
SY Does the container represent the embedded history of the locality? YES

MA Is the container flexible, to encourage experimentation? YES
MA Do the visual qualities of the container act as resources for creativity and innovation? YES
Figure 76: The spatial elements from the theoretical framework that are used to define the potential.
DEFINING POTENTIAL: CROSSING THE STREET

In this sub section the potentials for each of the four meanings of space are presented. These potentials are based on the elements already present in the area, and are aimed at stimulating the development of the cluster. In figure 76, the spatial elements from interpreting the space that fulfil the core function in this container, have been highlighted. Firstly, the potentials will be shown separately in diagrams, see figure 77. Secondly, they are combined to show the full potential of this container, see figure 78. An accompanying text will provide the reasons for these elements that fulfil the potential.

For the purpose of this thesis, only one container is shown. Would the method be applied in reality, all the containers in the collection should have their potentials defined. This full potential is not meant for direct translation into interventions. Choosing which interventions will be implemented is also based on the adjacent containers, and will be discussed in the next section.
Spatial elements fulfilling the potential

- Economic potential: based on the presence of the event location, connecting de Fruitvis to the road would enhance the economic meaning of space in this container
- Social potential: enhancing the appropriative capacities in order to support the symbolic and economic space. This can be done by placing a variety of sitting elements or flexible sitting elements.
- Material potential: the flexibility of the parking lot can be enhanced by turning it into parklets: small parks made with plants or small trees in pots on parking places.
- Symbolic potential: this container does not have to space to hold a landmark, that has the same value as the Marconi towers. However, it can enhance its symbolic meaning with direct physical connection with the water. For example, turning a part of the quay into a stairway can provide access to it.
Application of the MASDP
In this section the third step of the method will be applied, the step of Adaptation (see figure 79). The adaptation step comprises two parts: the balancing of the interventions and remaking the maps to reflect on the change. Since this is an illustration of the method, and the interventions have not been implemented, only the first part of this step will be presented. In sub section 4.4.1 the balancing of the interventions is shown, by means of internal and external constraints. In subsection 4.4.2 the choice for one intervention in the container is presented.
§ 4.4.1 BALANCING INTERVENTIONS

Balancing the interventions is based on two types of constraints and, if necessary, the concern of diversity in the cluster. This container has no internal constraints, which means there are no objects in the container that prioritize a certain meaning of space. However, its two adjacent containers do have internal constraints, which will be described below. Following the internal constraint, the influence on the base container will be described as external constraints.

Internal constraints of the adjacent containers
The two adjacent containers (figure 80) of the base container are much more defined by the surrounding objects that the base container. The smaller container functions as the entrance to de Fruitvis and a restaurant that uses its own produce (figure 81 right). Its potential lays only in enhancing the symbolic space, to support the activity in those two objects. The larger container is characterized by the presence of a creative business complex (figure 81 left).
This business complex is located in a former warehouse and holds over 25 small companies. Within the whole collection, this is an important asset in the success of the creative cluster. Therefore, it is needed to enhance the space around this complex, which is the larger container. Due to the current state of that space, interventions in the material space are the only possibility.

Thus, the two adjacent containers of the base container, have only one possibility for interventions because of their internal constraints.

**External constraints of the base container**

The potentials of the base container are not determined by internal constraints, meaning that all interventions are a possibility. However, since the adjacent containers have certain interventions that are needed, external constraints apply to this container (figure 83). The potentials for material space and symbolic space need not be executed, because they are needed in the adjacent containers. Due to the medium value of the economic meaning of space and the proximity of the creative business complex, interventions from the economic potential will not be effective. Therefore, there rests only one intervention possible, that of the social meaning of space.
§ 4.4.2 TOWARDS THE SOCIAL SPACE

The intervention that is going to take place in this container is in the social space. It is needed to develop the potential for interaction and connecting the existing symbolic space to the existing economic space. From the precedent projects, several ideas for a full value of social space have come forward (figure 85). In NDSM, a variety of sitting elements is used to accommodate the meeting place. In Strijp-S, striking objects are used that can act as a conversation starter to encourage encounters. The eventual design of the social space will be done by an urban designer, but the assignment is made clear.
Figure 86 The chosen potential for the social meaning of space.

Figure 87 The change from current value (left) to the future value (right).
CONCLUSION: ILLUSTRATION OF THE MASDP

This chapter illustrated the application of the urban design method. An existing situation was therefore used to answer the question: ‘Can the urban design method be applied in the Merwe-Vierhavens’ area to stimulate the development of a creative cluster?’

In this section, two aspects will be discussed. Firstly, a recapitulation of the application of the method will be given. This can be seen as answering the sub question. Secondly, preliminary lessons will be drawn from the process of applying the method.

Recapitulation of applying the method

The location in the inner-city harbour of Rotterdam was chosen as an up and coming creative cluster within the city, that has special attention from the municipal government.

As the illustration of the method has shown, it can be applied to stimulate the cluster. The method analyses the existing area and shows a collection that is needed to connect two smaller sub clusters. Within this collection the method has shown for one container its current and potential value. The four meanings of space have shown that the social space and the material space had a low value. After the external constraints from the adjacent containers, the choice was made for interventions in the social space.

The eventual design for the intervention in the social space is in the hands of the urban designer. But two precedent projects can prove to be inspirational. Two established clusters in the Netherlands, Strijp-S in Eindhoven and NDSM in Amsterdam, were given the same interpretation of space as the container in the M4H cluster. They showed a full value of social space with different spatial elements. In Strijp-S striking objects were used that can serve as conversation starters and in NDSM a variety of sitting elements was used to provide for the meeting places.

Preliminary lessons drawn from the application

Based on the application of the method in the M4H area in Rotterdam, with inspiration from the established clusters in Eindhoven and Amsterdam, at least two lessons can be learned. The first lesson deals with the transferability of the spatial elements and the second lesson deals with the fusion of the four meanings of space. Both will be discussed now.

The first lesson is that the spatial elements found in established cluster cannot directly be transferred to the developing clusters. When the method was applied in the M4H area, interventions in the social meaning of space were found necessary. For these interventions inspiration was drawn from the clusters of Strijp-S and NDSM. One could think that with directly transferring those spatial elements to the developing cluster, success is guaranteed. But the spatial elements are strongly linked to their original container and the other spatial elements in that container.

This lesson is summarised in figure 88: spatial elements cannot directly be transferred into other clusters.

The second lesson leads to the hypothesis that successful clusters have containers with more
diffused meanings of space. This lesson is based on the comparison between the developing cluster and the established clusters. The interpretation of space, the first part of the second step in the method, differs between the case of Rotterdam and the cases of Eindhoven and Amsterdam. The container in Rotterdam appears to have more spatial elements that are functional in one meaning of space, while the containers in Eindhoven and Amsterdam showed container with spatial elements that are functional in multiple meanings of space. This results in the established clusters to containers with a more diffused meaning of space. This lesson is summarised in figure 89: successful clusters have containers with a fusion of the four meanings of space. This lesson is in the form of a hypothesis a should therefore be further researched.
In this section the answer to the main research question will be given. In the first section a short summary is presented of the conclusions of the three sub questions. The second section will present the answer to the main research question, along with some reflective comments. The compulsory reflection can be found in the next chapter.
§ 5.1 SUMMARY OF THE PREVIOUS CONCLUSIONS

As became clear in the theoretical framework, constructed within the scope of the first subquestion in chapter 2, the four meanings of space are the core of understanding the role of space in the functioning of creative clusters. The economic, material, symbolic, and social meaning of space all contribute to what we see as the public space. The concept of the four meanings of space was then used to develop an urban design method in the second part of the thesis, chapter 3. The urban design method translated the concepts from the theoretical framework into useful tools for practice. The urban design method is constructed around three steps: Analysis, Action, and Adaptation. The first step shows the where eventual clusters are on the location and points out a working region that needs intervening. The second step looks closely at the current, and potential values for the four meanings of space. The third step zooms out back to the working region to balance out all the potential values and form the best proposal for the working region. As an illustration of the method, it was applied to an up and coming creative cluster in chapter 4.
Conclusion

§ 5.2 NARROWING THE GAP IN KNOWLEDGE

What are the spatial features of creative clusters and how can they be applied in a framework for urban design? This question, posed at the beginning of this thesis, has indeed been answered through the sub questions. The theoretical framework has provided knowledge on the spatial elements of creative clusters. And the proposed Method for Analysing Space and Defining Potential has translated these concepts into a framework for urban design.

In the problem statement it was posed that the spatial features of creative clusters needed to be defined. With this research that is partly done. The concept of the four meanings of space has been used to identify the spatial elements in creative clusters and has been used to propose interventions for creative clusters. Due to the extreme diversities of space in creative clusters, I think this is the closest to defining the spatial elements of creative clusters. As shown in the precedent projects, the spatial elements in established clusters in the Netherlands alone, are hardly comparable. It would therefore be almost impossible to define the spatial features of creative clusters in general. So instead of defined spatial features, a method to identify spatial features in creative clusters has been the result of this thesis.

Next to the definition of spatial features, it was the goal to narrow the gap between theory and practice. With the development of the Method for Analysing Space and Defining Potential, this has certainly been achieved. The concept of the four meanings of space has directly been implemented into the method, making it usable in practice.
This reflection is a compulsory part in graduating from the faculty of Architecture and the Built Environment. In this reflection attention will be drawn to five subjects. These five points of reflection are: my aim of connecting theory to practice; the relation between this project and the wider social context; the method itself; the process of graduating; and the future possibilities of the method.

Relation between research and design in this project
Throughout this thesis there has been a strong link between research and design. The method that is proposed, was constructed around theoretical concepts. Which has resulted in a direct translation of concepts from theory to practice. This has been a personal wish to do. I am thus very content that the concept of the four meanings of space is present in all chapters of this thesis. The four meanings of space have been found in theory, used to construct the proposed method, and proved to be able to identify the spatial elements when the method was applied. Although I was successful in narrowing the existing gap between theory and practice, it has been a one-sided action. As can be seen in figure 90, theory has been brought into practice. Even though several calls for research from other scholars show that this was necessary, it is not the only way to connect theory to practice. There is of course another way, which is the other way around, see figure 90. This would mean learning from practice, and thereby adapting the existing knowledge on creative clusters. With the proposed method, this path could be chosen for further research.

When aiming for narrowing a gap between theory and practice, both directions should be considered. This project has been a first set up in the interplay between the theory and practice of creative clusters.

Relation between this project and the wider social context
One of the consequences of the existing gap between theory and practice are the associated dangers of gentrification, displacement, and loss of culture when developing creative clusters. With the aim of connecting theory to practice, the method tries to overcome these dangers in several ways.
This method looks at the existing spatial elements in the cluster, showing that a cluster cannot be created out of thin air, and that it is not a one size fits all recipe for success. With the attention for existing spatial elements the local culture will be honoured. In order to avert the processes of gentrification and the self-destructive tendencies of diversity (as mentioned by Jane Jacobs in 1969), there is explicit attention for diversity when applying the method. For a cluster to function successfully, a balance between almost all morphological aspects is needed. These include a mixture of old and new buildings, large and small, and high and low rents.

It might seem contradictory to develop a method that will help developing creative clusters, when I just stated that cannot be designed and that it can have negative societal effects. However, the goal of this method is to show the potential of the spaces. To treat the spaces of the possible also as reality and giving credit to the embedded truths of a location. The dangers and critiques when dealing with creative clusters are well represented in the scientific scholarships, often as a reaction to practice. This method offers a contribution in preventing these dangers from happening.

Loose ends in the method

In retrospective, there is, at least, one aspect that needs to be improved on the method. This concerns the role of the mappings in the method. Although they are not part of the bridge between theory and practice, see figure 91, they can play an important role in the successful application of the method. This ties in with the preventing of the mentioned dangers previously. Within the mappings a distinction can be made in the aspects that can and cannot be changed within the scope of the method. The initial use of the mappings does not pay attention to this distinction and the mappings are solely used to determine the working region within a cluster. As a consequence, the method could be applied in any region and the outcome would say that many interventions are needed. But it is the nature of creative clusters that they cannot be created out of thin air. So, there is a mechanism needed to prevent unfeasible use of the
method. There is a certain base of morphological diversity needed to start with. This is where the distinction in the mappings comes into play. In order to determine the suitability of a location for creative cluster development, an extra step is needed in the method, see figure 92. This step, step 0, will be the mapping of the morphological aspects as they are now stated in the first step. Based on these results the decision can be made to start with the method. The socio-economic mappings will stay in the first step, since they visualize the intensity of clustering and are inherently needed to determine the working region.

Based on these improvements to the method, it seems that more attention is needed to the beginning of the method. More details are needed to specify that the method will not work in any given location.

Future possibilities

For the future possibilities of the method, three further lines of research are suggested. First, of course, testing the method in practice. The application of the method in chapter 4 has been in a hypothetical situation. As mentioned in the reflection on the relation between research and design, for a successful bridging of theory and practice, the direction of practice to theory should be explored as well. When applying the method for real, the results can be used to develop the existing theories on creative clusters and their spatial elements. Secondly, further research into the concepts of space is needed, since this is an ongoing process. The digital space for example is very important in creative clusters. This type of space has not been the focus of this project, but one can image that the features of digital space can also determine the functioning of creative clusters. Therefore, the concept of the four meanings of space can be extended as shown in figure 93. Also, the spatial elements in the four meanings of space are subject to constant evolution. The framework will have to be changed accordingly over time.

Thirdly, the application of the method elsewhere can be researched. It is, in essence, a
Spatial elements in creative clusters

Proposal for looking at space differently. It was needed because creative clusters are very complex spaces. Maybe the same mechanism can be applied in other complex spaces in cities. The method has now been tailored for creative clusters, so the core functions for each meaning of space will have to be adjusted to a new situation. New applications could include multimodal public transportation nodes like train stations or inner cities dealing with tourism. Public transportation hubs are an example where the core functions of the four meanings of space need to be changed. The material space will probably deal more with efficiency and capability of large flows of people. The symbolic space will revolve more around clarity and wayfinding. Here I see a task for others to take part in the evolution of the proposal for this method.

Process of graduating

Within this reflection I would like to take some space to reflect upon my own role in this project. As I have mentioned before, I take great interest in the translation of theoretical concepts into practice. This is for a large part the reason that this project has resulted in the proposal for a new method. But this proved to be a somewhat difficult position for me. As I was both the maker and end user of the method. This meant that I was playing two roles by myself, which made it hard to signal potential problems in time. I realise that this situation in all probability will not occur in practice. There will be a real client and real end users. In the ideal situation I would have had several feedback moments with the eventual end users to receive their input. Unfortunately, this has not happened in this project, but is definitely a point of attention that I take with me.
REFERENCES


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“Cities, like dreams, are made of desires and fears, even if the thread of their discourse is secret, their rules are absurd, their perspectives deceitful, and everything conceals something else.”

— Italo Calvino, Invisible Cities