OFFICE SITE TYPOLOGY

A systematic approach to type construction of office sites based on spatial parameters.

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MSC THESIS | MARIAM ANNALI

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Delft University of Technology
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PREFACE

This masters' thesis is carried out for the MSc Real Estate and Housing of the Faculty of Architecture at the Delft University of Technology. This study is developed in the graduation lab Corporate Real Estate Management (CREM).

The initial ideas for this research came from my participation in the organizing committee of the Corporations and Cities Colloquium, held in May 2008. I then gained more insight in subjects relating to CREM and the relation between corporations and cities. I chose to continue working on this theme during my graduation and conduct a research at the intersection between CREM and Urbanism. The focus is on the physical accommodation of corporations in various types of office sites.

This study is about the spatial characteristics of office sites and the classifications of these into an office site typology. The thesis gives insight in spatial parameters that are relevant for the identification of types of office sites. By means of quantitative and qualitative analysis types have been identified for the office sites in Amsterdam. A systematic approach has been defined which offers a tool for further research on office sites in other cases in the Netherlands and beyond. The research is relevant because it advances a better understanding of office accommodation on sites and creates a clear language of speech on types of office sites.

I would like to thank my mentors Herman Vande Putte and Roberto Rocco for their valuable guidance and comments throughout the research process. My gratitude also goes to dr. Meta Berghauser Pont who has been very helpful in solving essential issues of the study.
I am at most grateful to my parents and family for their support and confidence in these years, Iliass for his unconditional support and taking care of me through this process. Special thanks to Ondina for her friendship and helping with the layout and printing of this thesis. Last but certainly not least, Mayada I thank for the endless discussions and laughs throughout our university years and for being a true friend.

Amsterdam, October 2010

Mariam Annali

SUMMARY

This work explores whether a typology can be defined of office sites. This is done through illustrative case studies of office sites in Amsterdam. The research takes place at the intersecting fields of corporate real estate management (CREM) and urbanism. It focuses on the accommodation of corporations in cities with an emphasis on office sites.

In practice and literature the notion office site is often being used, considering all office sites alike. There is a gap in research on characteristics of office sites; the current studies mainly focus on economic values of offices such as rent levels and vacancy rates. This study aims at filling this gap in literature by performing a study into the classification of office sites based on spatial parameters. This in order to explore whether different types of office sites can be distinguished.

Research design and approach

This is a qualitative and quantitative case-study research where nine case-studies of office sites in Amsterdam are conducted. This research has been designed in five parts along which the report too has been organised.

The first part of the research mainly identifies the main research subject and defines the primary objectives of the research. The second part on the theoretical input explores literature on organisational and spatial typologies. The third part gives the framework for analysis which is derived from the theoretical input. The framework gives the parameters to be examined in the analysis of case studies. Further, nine cases studies in Amsterdam are selected and introduced. By means of operationalised parameters the selected cases are then analysed in this part.
The fourth part defines methods for classification of parameter values. Through a mathematical, quantitative and visual approach the identification of combination is enabled. Next, by means of type construction based on decisive parameters types of office sites are defined. In the concluding fifth part of this report, the research questions are answered.

Theoretical input

The theoretical input exists of literature on typologies used in (corporate real estate) management and typologies regarding the built environment. Typologies were explored to study their purposes and essential aspects so that these can be of input to a typology of office sites.

Typologies in the field of (corporate real estate) management are frequently aimed at differentiating ideal organisational types. The main purpose of these typologies is to define types of ideal organizations through which higher effectiveness can be achieved. Organizations that approximate one of these ideal types are expected to be more effective than other organizations.

Spatial typologies are different topology studies, regarding the built environment which have a descriptive nature. These studies concern bottom-up approaches which aim at classifying the built environment rather than defining ideal types. Spatial typologies are successful as communicator and often applied in policy making. The instructive aspect of current spatial typologies is that these are often very clear, readable and usable through the abstraction to a diagram in which the components of the studies come together.

Case study analysis

From the elements of both organisational and spatial typologies a systematic approach to the development of typologies is defined. This approach consists of five steps which have been applied in this study. The first step is to define a clear **purpose** of the aimed typology as to avoid confusion on the employment of it. Then relevant urban concepts have to be abstracted to **parameters**, since descriptions that are too detailed leave little space for type construction. The third step is to develop a **classification** scheme to enable combination of parameter aspects. The forth step stresses to define types on **constructs** of a same set of characteristics. To do so, decisive parameters for combination have to be identified. The last step is to clearly define and illustrate the constructed **types** to enable recognition and support a clear language on the topic.

Parameters have been defined; to a large extent based on the study of spatial typologies. Seven parameters for analysis are described and operationalised into measurable indicators. The analysis is started with the POSITION of office sites towards the city center. The parameter NODES expresses the connectivity in terms of availability public transportation near an office site. Whether a PERIMETER can be perceived around an area is illustrated in images. The forth parameter measures the DENSITY in different office sites. The average building size of offices in a site is articulated by GRAINS. FUNCTIONS measures the function mix in areas in percentages housing, amenities, business and offices. Last, the amount of companies which accommodate offices in sites is measured through the parameter USERS.

Type construction

The quantitative output of the analysis of office sites is used to derive a classification scheme for comparison. Three approaches of synthesis are used. The mathematical approach applies a matrix to classify abstract parameter values. To each parameter three values are assigned, e.g. Low, average or high density. The quantitative approach positions the quantitative values of parameters on the axes of a radar graph to enable the identification of combinations. The visual approach expresses a more in-depth classification method through images of the spatial arrangement of parameters in office sites.

By means of the matrix combinations between sites are further analysed. A set of four parameters was used to distinguish types on: DENSITY, GRAINS, FUNCTIONS and USERS. Combinations based on this set of parameters led to four types amongst the cases in Amsterdam. A metropolitan, central urban, supported offices and monofunctial office site.

Conclusions

To conclude, the research questions are reviewed. This study revealed four types of office sites. However concluding on generic types of office sites is not possible based on a data set of nine case studies. To do so, the data set should be enlarged, e.g. With office sites in other cities in the Netherlands. Overall it can be said that a classification of office sites based on spatial parameters does allow for office site type construction. The systematic approach of typology development could also be applied to concepts other than office sites.

VOCABULARY

AMENITIES Something that contributes to physical or material comfort (TAHD, 2009) In this case functions like shops, hotels and sports', educational and cultural facilities.

CONNECTIVITY Measure of the extent to which the components (nodes) of a network are connected to one another, and the ease (speed) with which they can 'converse' (BusinessDictionary 2010).

CORPORATION Although corporations are generally identified to private bodies formed to carry on a private business, this masters' thesis uses the notion corporation to encompass any large organization of people acting together under a statutory procedure (Nadin 2008:18)

DENSITY A measure of the quantity of some physical property (usually mass) per unit length, area, or volume (TAHD, 2009).

FUNCTION A special job, use or duty (of a machine, part of the body, person, building etc) (KEMD 2010).

GRAIN SIZE The term grain is synonymous with building. This thesis expresses the grain size of offices in average gross floor area in an office site.

GROSS FLOOR AREA The total floor area contained within a building including the horizontal area of external wall (DRO 2007).

INDICATOR Measurable variable used as a representation of an associated factor or quantity. For example, the Floor Space Index (FSI) serves as an indicator of density of the built form. (BusinessDictionary 2010).

MORPHOLOGY	Knowledge of form (Beerghauser 2007)
OFFICE	Buildings where activities are carried out that are mainly aimed at (administrative) processing of information and not on manufacturing, processing or storage of goods (Rijksplanologische dienst 2001).
OFFICE SiITE	An office site is a site or grouping of parcels where many office buildings are located, with at least 10.000 m² gross floor area of office space within a defined location.
PARAMETER	Any factor that defines a system and determines (or limits) its performance (Wordnet 2008).
PERIMETER	The outer limits of an area (TAHD, 2009)
TYPE	A type is identified when principles of spatial arrangements or form structures keep recurring (Leupen 2002:108)
TYPOLOGY	The study or systematic classification of types that have characteristics or traits in common (TAHD, 2009).
USER	A person or entity who makes use of a thing, good or building (WordNet 2008). In this research by users is meant the organization that accommodates a building.

Content

1 PART
Research Definition

In the first part, research definition, the research theme is explored.

Chapter 1, research introduction, describes the motivation and problem field of the study. Objectives and research questions are formulated based on the problem analysis. Further is the relevance of the research explained.

In chapter 2, research methodology, the research model and methods are set forth. The case selection in Amsterdam is briefly described and the collected data for analysis is listed.

1. RESEARCH INTRODUCTION

1.1 Motivation

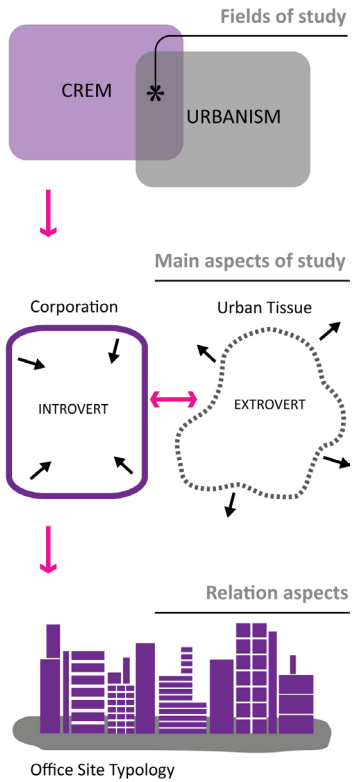


Figure 1.1 Fields of study

The initial intent of this research on the intersecting fields of study of corporate real estate management (CREM) and urbanism originated from the participation in the Corporations and Cities Colloquium in 2008. This colloquium was part of the Corporations and Cities research project, which is currently worked on at the department of Real Estate and Housing.

The project Corporations and Cities focuses on the relation between the accommodation of large scale organisations and urban planning. The way organisations such as multinationals, governments and educational institutions fulfill their accommodation needs, influences significantly the structure and liveability of cities. Vice versa, the vision and policies of city managers have an important impact on the corporations settled in a city (Vande Putte 2009:48).

This research continues the study on the obvious interaction between CREM and urbanism. Corporations are purpose driven. In essence corporate members decide unhindered in function of their own agendas on the continuation and operational shape of their corporation. They have to deal with the competition of other organisations, which involves efficiency and innovation, and take legal and social limiting conditions into account. As their survival depends on the continuation of the offered advantages, corporations are introvert, selective and opportunistic. They strictly manage the corporate boundary and the interaction with the corporate environment (Vande Putte 2009:49). In contrast, cities have an extrovert character since their advantages are accessible for all citizens.

Corporations and Cities have office sites as spatial intersecting fields. Throughout the different courses of the master Real Estate & Housing the term ‘office site’ sometimes was mentioned. From lectures and from literature available on this notion appears that the term is usually handled as if all office sites are alike. There are no adjectives used when discussing office sites.

1.2 Problem Field

This work explores the spatial characteristics of sites where office buildings are situated; this is done through illustrative case studies of office sites in Amsterdam.

There is a variety in typologies known: of housing environments (ABF Research 2002), office sites (Hoek 2007) and also corporations (Mintzberg 1979,1983, Gillen 2008). Typologies are successful as communicator and often applied in policy making. Typologies create a language that is understood by stakeholders when trying to convey a message (Vries et al 2006). The aim of this study is to explore whether types of office sites can be identified. To our knowledge this aim of study has rarely been attempted before.

In some studies of market parties office sites are being compared. For instance, the real estate agency DTZ (2010) annually publishes reports on trends and developments in office markets in different cities in the Netherlands. Boer Hartog Hooft (2009) performs a similar though thorough study specifically for the large region of Amsterdam. The focus in these analyses is however mainly on economic aspects. Fact sheets are listed, representing the office and business market in regions with data on rent levels, vacancy rates, amount of office supply and the amount of transactions that have taken place annually. There is little knowledge on which spatial aspects are present in office sites and whether types exist.

There is a gap in scientific research regarding this theme as well; little current research can be found on office sites and their characteristics. Hoek (2007) defined a typology of office sites based on their period of construction. However no spatial differences amongst office sites were outlined. This study aims at filling this gap since it is of relevance to learn about types of office sites. Knowledge on an office site typology enables a clear language between stakeholders and can possibly be incorporated in policies or strategies regarding accommodation of corporations in office sites. A study based on spatial aspects is expected to also enhance a better understanding of the relation between office sites and the rest of the city.

Corporations take up a large part of a city's real estate stock. The locations of office buildings are of main interest to this study. A common type of corporate location is a cluster of firms that can benefit of agglomeration advantages such as cost reduction of transportation of goods and people due to proximity to other corporations. This phenomenon exists in most large cities. What other types are to be identified? There are for instance

corporations which locate in historical parts of cities or corporations that locate in green campuses. Furthermore do sites near stations or highways seem to be attractive for organisations to accommodate. So what different characteristics make up for a type of office site? Which spatial parameters are relevant in the assignation of these?

The city of Amsterdam will be used to generate illustrative case studies of office sites for the analysis by means of relevant spatial parameters. The intention is to construct types from the study of selected sites in Amsterdam. Further, is a main goal is to derive a generic systematic approach, applicable to other studies on typifying office sites.

Problem statement

In practice and literature the notion office site is being used, considering all office sites alike. There is a gap in research on characteristics of office sites; the current studies mainly focus on economic values of offices. This study aims at filling this gap in literature by performing a study into a classification of office sites based on spatial characteristics. This in order to explore whether different types of office sites can be distinguished.

1.3 Objectives and Research Questions

The main objective is the search for a classification based on spatial parameters. Such a classification is expected to allow for decisive parameters to be identified. Based on the decisive parameters of analysis, office sites can be compared and hereafter distinguished. This method for type construction will highlight which types are present amongst the case studies in Amsterdam. A synthesis of parameters should illustrate possibilities for office site types. By means of illustration and concise descriptions will be attempted to represent distinct types of office sites.
The analysis and synthesis aspects are part of a systematic approach for creating a typology of office sites. There is aimed at defining a generic approach which is applicable in further studies regarding this topic.

The following research question and sub-questions are derived from the problem analysis.

Main question

Can different types of office sites be distinguished based on spatial parameters?

Sub-questions

The next sub-questions are relevant in answering the main question.

Typology Studies

What is the purpose of typologies and what are essential elements of these?

This first sub-question is oriented at understanding what typologies are used for and how these can be defined and constructed. Through the examination of existing typologies in (CRE) management theories and literature on the built environment, an approach to developing typologies can be defined and applied in this research.

Spatial Parameters

Which spatial parameters could be relevant to distinguish office sites? Which (of these parameters) are decisive in the assignation of office site types?

Distinguishing types of office sites will be done based on spatial characteristics of sites. It is therefore relevant to study which spatial parameters can be useful in the analysis of cases studies. Furthermore is it important to identify decisive parameters to create combinations of the same set of parameters.

1.4 Relevance of the Research

Academic Relevance

Every science or discipline needs a clear conceptual framework for discussion or practical application. Through a systematic approach of parameters, in the search of office site types, is attempted to add to this scientific essence. This is done by clarifying general assumptions on certain concepts (e.g. office sites) and their spatial characteristics.

The results of the research add to theory on corporate real estate management primarily, since there is a lack of literature on spatial characteristics of corporate locations or office sites. Locations are very significant for corporations in (re)evaluating their portfolios. The

results on types of office sites could be incorporated in the elaboration of corporate and urban strategies.

Scientists

Furthermore it can be of value for theory on urban planning in addition to the PhD study of Rocco (2008) about location patterns of advanced producer services in the Randstad and Sao Paulo. This graduation thesis topic also fits in with the PhD research theme of 'Implementability of accommodation strategies – Design and evaluation of a methodology by types' currently researched by Vande Putte with the department of Real estate and housing.

Practical relevance

This study has practical relevance to both practitioners in the field of corporate real estate management and local governments that are involved with the development and location policies of office sites.

CRE managers

The results provide corporate real estate (CRE) managers with insights on office site types. This could be implemented in corporate real estate strategies, which also concern location choices, for their own portfolio. Further, can the differences regarding urban characteristics between the offices sites be instructive to CRE managers.

Local governments

A main theme of this work is the classification of spatial characteristics. Earlier studies have been done related to this theme, Spacemate (Berghauser Pont & Haupt 2010) and the MXI (Hoek 2010). This work uses that knowledge and adds to the literature as well. This study helps to create a better understanding of the aspects that are of significance for enterprises to locate their command activities in urban networks. These results could be of value for local governments when conceiving policies on location assignment of functions throughout the city.

2. RESEARCH METHODOLOGY

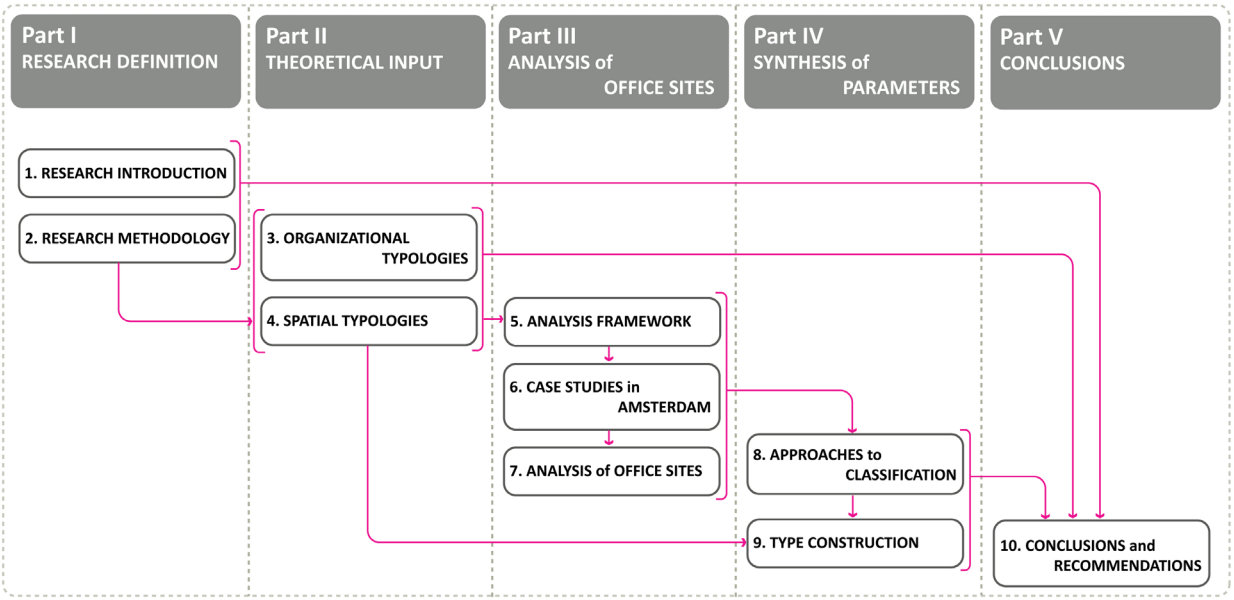


Figure 2.1 Research model

2.1 Research Model

The research model is illustrated in the figure above and shows the structure of different chapters in this report grouped in five parts.

In the first part, research definition, the research theme is explored. The problem, objectives and research questions of the study are formulated in the research introduction. The research methodology is designed based on the aims of the study. The research methods are introduced and the data collected for analysis is listed.

The second part, theoretical input, is where the literature study is conducted. The input of theory is aimed at investigating the use and essential aspects of typologies. Examples of organisational and spatial typologies are studies.

In the third part, analysis office sites, parameters for analysis are derived from the literature study. Further, is an approach to the development of typologies defined from the theoretical input. The steps of case selection are reported on in detail and the cases studies are introduced. Through operationalisation of parameters all case studies in Amsterdam are analysed.

The forth part is where the office sites are compared based on parameter values. Three approaches for synthesis, which offer classification schemes of parameters are presented. The next step was to construct types based on the synthesis, define and illustrate these.

In the concluding fifth part of this report, the research questions are answered. Finally conclusions are drawn on the main aim, methods and results of the study, followed by recommendations for further research.

2.2 Research methods

The research methods used in this research include literature study, observations and data analysis. Through literature study the relevant themes to the research, aspects of typology studies and parameters for analysis were outlined.

From the Municipality of Amsterdam (Dashorst 2010) relevant data concerning the selected office sites has been acquired. The derived parameters are operationalised by assigning a method for calculation to each parameter, which enables the data analysis and comparison of the case studies. The assigned methods to parameters are determined based on the availability of data.

In addition, site visits were used for observing the spatial aspects of the sites such as density, grain size, etc. This is done to validate the output of parameter calculations. The research is explorative in nature and with an original purpose, therefore methods for synthesis have been designed based on the purpose of the classification of characteristics of office sites. Three approaches for synthesis have been applied: mathematical, quantitative and visual approach.

2.3 Case Selection

The city of Amsterdam is used to select urban office sites for the exploration into the existence of office site types.

The office market of Amsterdam has a stock of 6,7 million m2 which makes a large and very diverse market (DRO 2010). There are many different locations like mixed inner-city locations, the station sites Amstel and Teleport, specific office locations like Riekerpolder and together with the development of the international oriented Zuidas the city offers a variety of locations to accommodate corporations.

Chapter 6, Case studies in Amsterdam elaborates on the exact selection of cases. The approach to selection and demarcation of office sites for analysis is described there. Nine office sites have been selected and are introduced.

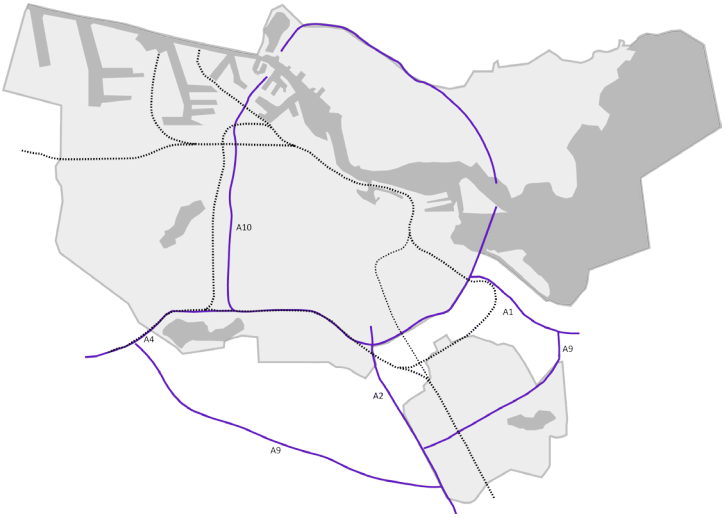


Figure 2.1 Basic outline of Amsterdam

2.4 Data Collection

The data for analysis has been obtained from the urban planning department (DRO) of the Municipality of Amsterdam and from the department of Real Estate of Housing of the Faculty of Architecture.

The information has been extracted from the municipal GIS database. These data originate from economic databases and surveys throughout the city. Only data on the office sites, within the demarcated areas, has been collected for this study. Most of the building information dates from 2008. The received data set from DRO is based on the parameters and consists of:

- Gross floor area of all buildings in m² per area and divided in functions (housing, amenities, business and offices); from 2008.
- Office site sizes and other relevant size data to be used for density indices; from 2008.
- Information on public transport types and stops in and around the sites; current.
- Employment figures, employees with at least 12 working hours per week, from 2009.
- Data on number of companies categorized by number of employees, based on registration at the Chamber of Commerce (Kamer van Koophandel, KvK). Data on amount of employees is achieved by the KvK through an annual voluntary questionnaire to companies, this has a response rate of 60%. The data is therefore from different years, starting from 2005.
- A data set with all companies with 50 employees or more in the demarcated sites have been listed. The data set consists of name of the name and address of a company. The number of employees which work at least 12 hours a week and year of data is also included. The data is also from different years, starting from 2005.

From the department of Real Estate & Housing data on building size was provided:

- Office stock database of Rudolf Bak with data from 2007. This database has been adjusted by Delft University of Technology, Department of Real Estate & Housing. This database contains 1181 office buildings with address, postal code, year of construction (not for all buildings) and total floor size for each building.

2.5 Guidance

This research is being guided by two mentors who have been asked because of their expertise related to the theme.

1st Mentor, Real Estate & Housing

Herman Vande Putte conducts his PhD research on the implementation of corporate real estate strategies with the department of Real Estate & Housing. He is an assistant professor with the Corporate Real Estate Management section.

2nd Mentor, Urbanism

Roberto Rocco is assistant professor at the Department of Urbanism and did his PhD research there. The PhD concerned the role of Foreign Direct Investment (FDI) as a factor for urban change. This has been explored by investigating the location patterns of advanced producer services in the Randstad and Sao Paulo.

2 PART
Theoretical Input

The aim of this study is to derive a typology of office sites from case studies in Amsterdam. First a literature study is conducted in order to determine the importance, use and aspects of typologies. The next sub-question is leading regarding the theoretical input:

What is the purpose of typologies and what are essential elements of these?

In the chapter 3 Organisational Typologies theory regarding the use and essential aspects of organisational typologies are set forth. Examples of these typologies are discussed.

Chapter 4 Spatial Typologies typology explores typology studies of the built environment. The emphasis is on studies into classifications of aspects of the built form. The methods applied to arrive at the proposed typologies and their applications are assessed.

3. ORGANISATIONAL TYPOLOGIES

3.1 Definition and use of Organisational Typologies

In management literature typologies are often characterized as classification schemes. Rich (1992: 758) states that typologies by means of classification schemes offer 'a means for ordering and comparing organizations and ordering them into categorical types'. This definition corresponds with the general definition which considers a typology as 'the study or systematic classification of types that have characteristics or traits in common' (TAHD 2009). Classifying organizations into types presents an alternative to the idea that organizations are either all alike or are all individually unique. Typologies are considered a form of theory which provide a parsimonious framework for describing complex concepts (Doty & Glick 1994).

Literature on typologies in the field of management is frequently aimed at differentiating ideal organisational types. Configurational theories compose a growing body of organisational literature. At the organisational level of analysis, configurational theories typically posit higher effectiveness for organizations that resemble one of the ideal types defined in the theory. The increased effectiveness is attributed to the internal consistency, or fit, among the patterns of relevant contextual, structural, and strategic factors (Doty et al 1993). One example that has enjoyed widespread popularity is Mintzberg's (1979,1983) theory of organisational structure.

3.2 Mintzberg's Typology

Mintzberg (1979,1983) presented both a typology and a theory. As a typology, Mintzberg's work provides a rich descriptive tool that identifies five potentially effective configurations of design and contextual factors. As a theory, his work presents a series of logical arguments that result in specific predictions about organisational effectiveness as a function of the degree of similarity between a real organization and one or more of the ideal types.

He presented his typology in three parts: (1) a set of design factors that can be used to characterize an organization's structure, (2) a set of contingency factors that can be used to characterize an organization's context, and (3) five ideal types of organizations described in terms of the design and contingency factors.

(1) Mintzberg discussed primary and secondary design factors. Three primary design factors critical to each of the ideal configurations are:

- the key coordinating mechanism,
- the key part of the organization, and
- the type and degree of centralization.

(2) Multiple factors define the contextual configurations in Mintzberg's theory, including an organization's age and size and attributes of its environment and technology.

(3) Mintzberg synthesized the preceding design and contextual factors into the five ideal types of organizations:

- simple structure,
- machine bureaucracy,
- professional bureaucracy,
- divisionalised form, and
- adhocracy.

Organizations with **simple structures** have very active entrepreneurial top management teams that maintain centralized control of all operations and coordinate activities through direct supervision. The ideal context for a simple structure is an unsophisticated, non-regulating technology in a simple and dynamic environment, and the firm should be young and small.

Machine bureaucracies tend to be older, larger organizations operating with routine technologies in relatively stable environments. A machine bureaucracy is very high on standardization of work and moderately high on other forms of standardization, and it is dominated by its technostructure, limited in overall decentralization, moderate in terms of selective decentralization, and very bureaucratic.

Professional bureaucracies, such as universities and large accounting firms, also operate in stable environments and rely on standardization of skills and extensive training and indoctrination.

The **divisionalised form** is a corporate suprastructure imposed over a number of business units that tend to be internally structured as machine bureaucracies.

Finally, **adhocracies** tend to be very organic professionalised organizations that emphasize coordination by mutual adjustment and liaison devices. Adhocracies typically operate in turbulent environments.

Each of the five ideal configurations is a unique combination of organisational design and contextual factors. An organization that approximates one of these ideal types is hypothesized to be more effective than other organizations, especially when its context fits the ideal type.

3.3 Hybridization

Then there is also the possibility of an organization fitting in with two ideal types which in literature is defined as hybridization. All configurational theories initially identify a finite number of ideal types, as Mintzberg's five types. Many typological theories also allow for hybridization among the organisational types (Doty & Glick 1994). Hybrid types in organisational theories are combinations of the initial ideal types that are also posited to result in the relevant organisational outcome. Typically, hybrid types are posited to be effective when organizations must respond simultaneously to conflicting contingencies (Mintzberg, 1979).

Hybridization among the initial ideal types can result either in a finite or an infinite set of hybrid types. When a finite number of hybrid types are specified, these hybrid types are conceptually and analytically equivalent to the initial types identified in the theory (Doty and Glick 1994:241).

3.4 Guidelines for developing Typologies

Doty & Glick (1994) stress that in order to realize advantages of typologies these have to be properly developed. They have defined five guidelines for development of typologies, which originate from their analysis of organisational types of ideal types. This thesis aims at identifying types from existing office sites rather than defining ideal office site types. Still do the defined guidelines of Doty & Glick (1994:245) provide a guide for all sorts of typologies. The next guidelines are defined:

1. Typological theorists should make explicit their grand theoretical assertion(s).
2. Typologies must define completely the set of ideal types.
3. Typological theorists should make explicit their grand theoretical assertion(s).
4. Typological theories should explicitly state the assumptions about the theoretical importance of each construct to describe the ideal types.
5. Typological theories must be tested with conceptual and analytical models that are consistent with the theory.

This First guideline will help to clarify the intended purpose of typological theories. This is to reduce the level of confusion currently present in literature.

Doty and Glick argue that second guideline refers to the aspect that typological theories appear to identify a discrete set of organisational types. The inclusion and clear definition of possible hybrid types is also necessary.

The third guideline: Typologies typically provide very rich descriptions of the ideal types identified in their typologies, but often they describe the ideal types with different constructs and with relatively vague and inconsistent terms.

Mintzberg (1979, 1983) indicated which constructs are key parameters in his theory, but he did not provide concrete estimates of the relative theoretical importance of each construct (Doty & Glick 1994). The fourth guideline stresses that it is important to weight each parameter in order for the typology to be tested and accurate models of theory can be developed.

With the fifth guideline Doty and Glick refer to the testing and modeling of typologies which they have studies and suggest by means of mathematical equations. However these statements on testing and modeling typologies apply to organisational typologies which express ideal types of organizations. In descriptive typologies as in this research analytical modeling through mathematical calculations is relevant to a small extent.

3.5 Gillen's Typology

Besides organisational typologies that aim at describing ideal types to achieve effectiveness, also other typologies of organizations can be found. An example of such a study is the typology of Gillen (2008), which differentiated organizations by sector and characteristics based on processes in each sector. This typology, in contrast to the arguments of Doty and Glick (1993) on typologies needing to be considered as theories described before, is more of a classification scheme. This typology is therefore consistent with the definition of Rich (1992:758) that through classification schemes typologies are 'a means for ordering and comparing organizations and ordering them into categorical types'.

Gillen (2008) performed a study into the demand profiles of organizations and the associated implications for real estate and location. In her work she analyses the work processes of enterprises in different sectors. The demand profile of each industry is different. This variety leads to differences in the way corporate organizations occupy, manage and value real estate. A classification of organizations is created from the perspective of different sectors and the characteristics of the company process and the implications regarding corporate real estate. This is illustrated in two figures.

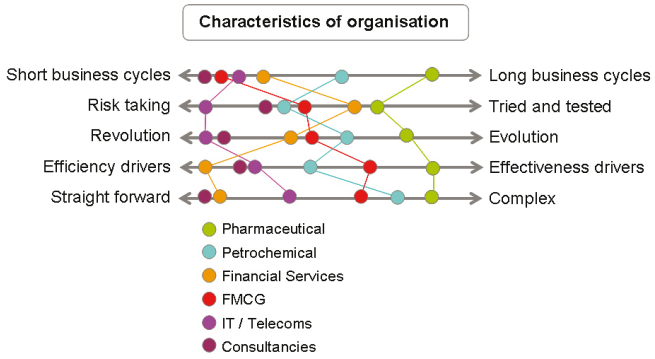


Figure 3.1 Sectoral comparison of organizational characteristics. FMCG: Fast Moving Consumer Goods. *Source: Gillen (2008)*

The first figure 3.1 gives a high level demand led comparison of six industries or sectors. The sectors are compared in terms of organisational characteristics.

The comparison drawn is based on analysis of business cycle, attitudes towards risk, efficiency drivers, such as cost and effectiveness drivers, such as value. A straight forward organization as defined by Gillen in this context is one with one primary activity, such as professional services, whereas a complex organization is one with multiple activities such as research & development, manufacturing and sales. The figure above shows that the organizations from different companies do quite differ in characteristics.

One of the most complex types of industries can be found in the pharmaceutical industry. They have long business cycles because it typically takes 10 years to get a drug to the market. This is a complex industry both in terms of its business activities and geographical spread. Activities include high tech research, laboratories and equipment, pilot plants to scale up products, manufacturing internationally and managing a geographically and functionally dispersed work force (Gillen 2008).

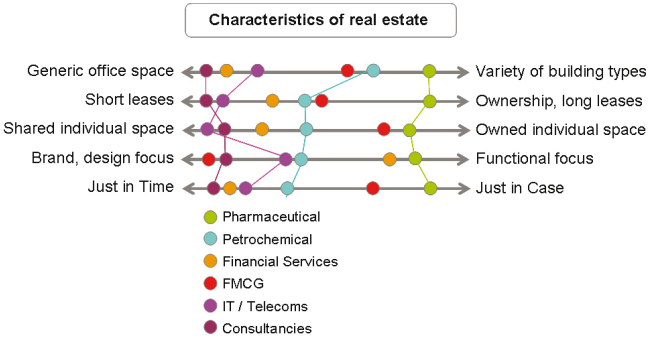


Figure 3.2 Sectoral comparison of real estate characteristics. FMCG: Fast Moving Consumer Goods. *Source: Gillen (2008)*

Besides the demand side, Gillen furthermore depicts the supply side characteristics associated with each of these profiles. This comprises the accommodation of the different industries. The comparison in figure 3.2 is based on an analysis of building typology, nature of lease, allocation of internal space, brand function and attitude to space management. Allocation of internal space refers to whether the firm assigns one desk to one person or whether any form of desk sharing is used. A 'Just in time' model indicates that space is acquired on demand. Under a 'just in case' model, space is available on the basis that it might be needed in the future.

These graphs are an orderly way of arranging different characteristics of companies concerning their internal process and corporate real estate. It gives and immediate overview and shows a typology of corporations based on industry.

From Gillen's study can be concluded that a classification based on sectors of companies and the analysis of companies based on process aspects and demand of real estate allow for corporations to be distinguished. The spatial implications derived from each sector even strengthen the sectoral typology. This approach is relevant for this study in search of a classification based on spatial parameters.

4. SPATIAL TYPOLOGIES

4.1 Definition and use of Spatial Typologies

Spatial typologies are not aimed at achieving certain effectiveness as through ideal types of organisational typologies is intended. In contrast to typologies defined in management literature, topology studies regarding the built environment are descriptive. These studies concern bottom-up approaches which aim at classifying the built environment rather than defining ideal types for certain urban notions.

Spatial typologies are successful as communicator and often applied in policy making. Typologies create a language that is understood by stakeholders when trying to convey a message. Those typologies used in spatial policies primarily have an analytic purpose. They help identify spatial patterns and hence provide policies with basic knowledge. Spatial typologies also play a role in monitoring urban developments. A spatial typology is defined as a classification based on predefined criteria (de Vries et al 2006:23).

Besides an analytic purpose typologies often have a steering function. These steering typologies are used as a result of a policy decision. For instance the housing environment typology was used to enhance the thinking in terms of supply and demand on national level in the Netherlands (de Vries et al 2006:9). This typology was initiated by the Ministry of Housing and Physical Environment (VROM) and distinguished five types of housing environments. Of these are four basic types and is the fifth type, rural areas added. The four basic types of environment differ in density, land use, type of function, attainability and nearness, private or public ownership, depicted in figure 4.1 (Brouwer 2000):

- **Central urban districts** with high density, mixed functions, a good external attainability and emphasis on the public space;
- **City housing districts** with fairly high density, mono functional ground use and specific social facilities;
- **Residential areas** with a low density of houses per hectare, mono functional ground use and large private areas;
- **Central village areas** with a low density, mixed functions and good social facilities;
- **Rural areas** with a low density, monofunctional ground use in a fairly green landscape.

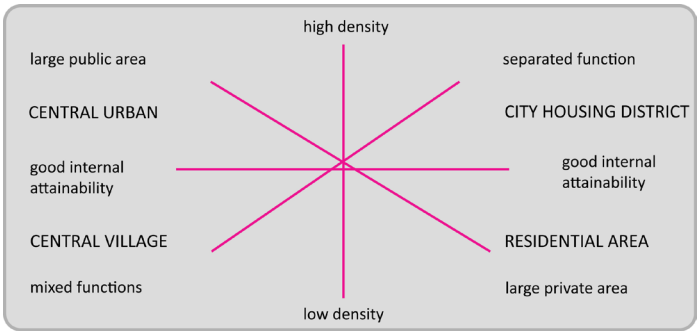


Figure 4.1 Types of Housing environment

Source: Brouwer (2002)

This typology is however less useful on provincial and municipal level. The division into five types is not suitable to make the demand for housing environments clear on neighborhood level. A refinement of the typology into ten or thirteen types still appeared insufficient (de Vries et al 2006:9). Since the housing environment typology is very general in nature; individual interpretations of this typology take place. As a result, general typologies on national level attain the function of reference images.

4.2 Act of Classification

Cuperus (2002) writes on the act of classification that it comprises components to be combined in an ordered whole. In architecture the ordering of the positioning and size of the components constitutes the essence of a design, execution and usage of buildings. In order to be able to classify, the components should first be brought under the same nomer. Classification is the condition for combination.
The architectural field can be classified in many ways, for instance according to discipline (foundation, façade, roof, etc.), scale, function, sequence, economics, culture, time and environment. All systems of structuring serve their own purposes therefore no particular system of structuring is optimal. The emphasis in this study is on classification based on spatial characteristics with the purpose of distinguishing types of office sites.

When components for classification are defined, they must be combined within a certain scheme (for a building, in architecture). This could be achieved by using mathematical models (Cuperus 2002). In architecture this usually happens by a design process.
This research aims at finding regularities and correlation between office sites and the

spatial parameters for analysis. Prior to starting the analysis the question that arises regarding the act of classification is: Are there constraints that limit the amount of possible solutions or combinations in defining types for office sites? What is the right amount of parameters for classification?

In other classifications these questions have also been relevant. Nevertheless there is very little theory on the way classifications of parameters to come to types should be organised or the amount of parameters to work with. This study attempts to capture the complexity of built environment into abstract parameters. Descriptions that are too detailed reproduce a complex reality and leave little space for type constructions and generic conclusions (Berghauser Pont 2009). There should be a certain balance between the type descriptions and the variables, This is illustrated in figure 4.2. As to working with parameters the general assumption is: the fewer the better.

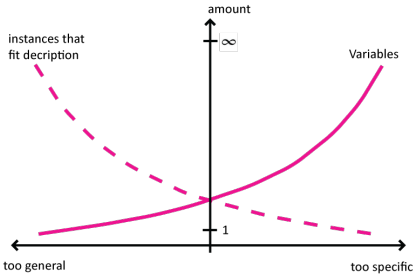


Figure 4.2 Tension between (too) general and (too) specific. *Source: Berghauser Pont & haupt (2009)*

This statement on the amount of parameters ('the fewer the better') relates to the third of five guidelines defined (Doty & Glick 1994): 3. Typologies must provide complete descriptions of each (ideal) type using the same set of dimensions, described in the previous chapter.
It is important to describe types in the same constructs and with consistent terms. Therefore in type construction should be sought for parameters that are decisive in identifying types of office sites. This research will therefore work with a number of parameters for type construction and will also attempt to bring the number down to the most necessary ones for an office site typology.

4.3 Office Sites in Amsterdam

Hoek (2007) has explored the development of office location in Amsterdam and defined a typology of office sites from a historical perspective. This historical perspective helps understand and explain spatial features stemming from specific beliefs and attitudes towards corporate accommodation.

Based on the general period of construction of office locations six types have been appointed to locations in Amsterdam. The urban positioning of office location in the city in the Netherlands traditionally is being marked by two mechanisms: the potential to connect directly to infrastructure and the zoning idea of modern urbanism.

In general terms the first offices, for banks, can be found in city centers amidst housing and amenities (close to the stock exchange). The offices where easy to reach by carriage, tram, bicycle and first automobile. Then, due to the emergence of the automobile in 1930s and 1940s, the urban positioning changes from centers towards the edges of the city near important roads.

Besides transportation, the development of office sites was also influenced by functional urbanism. In this concept functions were separated so mono-functional areas took shape. On account of this ideology offices got further away from dwellings and amenities. In the 1960s offices where still combined with business space for storage and assembly. However from the end of the 1960s complete office parks were build in the Netherlands with a dominant office role.

In the 1970s and 1980s the accessibility of office sites by car and train became important. Proximity is replaced by connectivity, which led to well connected and visible highway office locations. The current tendency is that of mixing functions again in office locations. The assumption is that mixed areas are preferable because these achieve lively areas which corporations nowadays want to be near or part of.

The next image represents how the office sites have developed as to the development of transportation types, according to Hoek (2007).

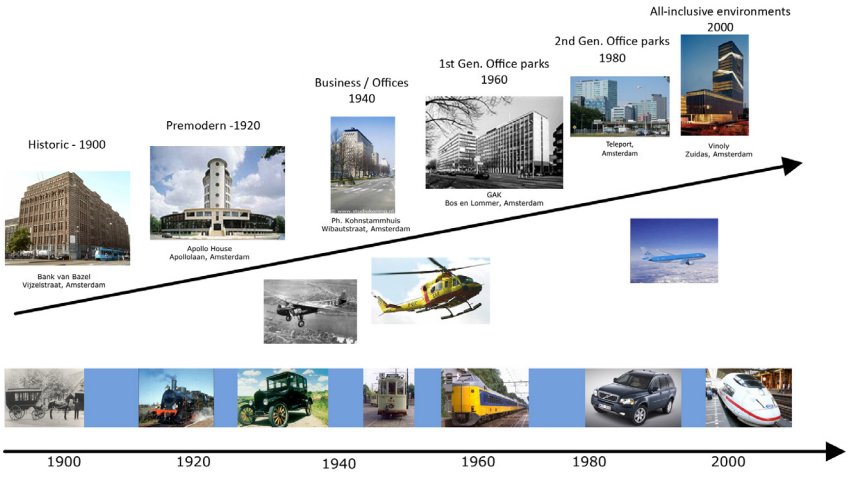


Figure 4.3 Development of office sites and transportation. *Source: Hoek (2007)*

The next six types of office sites in Amsterdam are distinguished by Hoek (2007):

1. Historical office location – 1900;
2. Premodern office location – 1920;
3. Business and office location – 1940;
4. 1st generation office parks – 1960;
5. 2nd generation office parks – 1980;
6. All inclusive environment – 2000.

1. The offices in historical office sites were designed as mansions. The size of these buildings usually was quite modest and were to be found in centers of cities, like at the canals of Amsterdam. These areas where accessible by boat, bicycle and carriage.

2. From 1920 the premodern office type is introduced, which is known for its large rooms with high ceilings and a central staircases. The scale of the offices became larger. More often more than one organization was accommodated in one building. Because of the uniform identity the architecture became more neutral. The office sites can be found near city centers. These locations could be accessed through the main road of the city.

3. The first autonomous working areas near the city take shape from 1940. These working areas are a result of functional urbanism and offer space for both business and offices. These buildings have a modern architecture with a utilitarian expression, and often build with minimal budgets.

4. In the early 1960s the first only-offices locations arise. These locations are based on the philosophy of the CIAM (Congrès Internationaux d'Architecture Moderne). This was expressed in a spacious setup, large-scale complexes, no amenities, lots of landscaping and a universal building typology. The locations are well connected to highways, but the connection to slow traffic network is minimal.

5. The office market flourished in the 1980s and 1990s. While the demand for well connected profile locations grew, inner cities allowed no more developments. Therefore office locations had to emigrate to nodes near railway and highway, at the borders of the city. There was also political support for the developments of these locations. Offices were clustered and this all has led to monofunctional office sites.

6. Since 2000 the 'all-inclusive' environments, the current type, are emerging. These areas are characterized by urban design, high densities, urban premises varied with

high-quality public spaces. The office sites are multi-functional in which living and working functions and amenities are balanced out. The locations are found near multimodal traffic node in the proximity to city centers. The Amsterdam 'Zuidas' and 'IJburg' are examples of this type (Hoek 2007).

Figure 4.4 shows where the different types are located in Amsterdam.

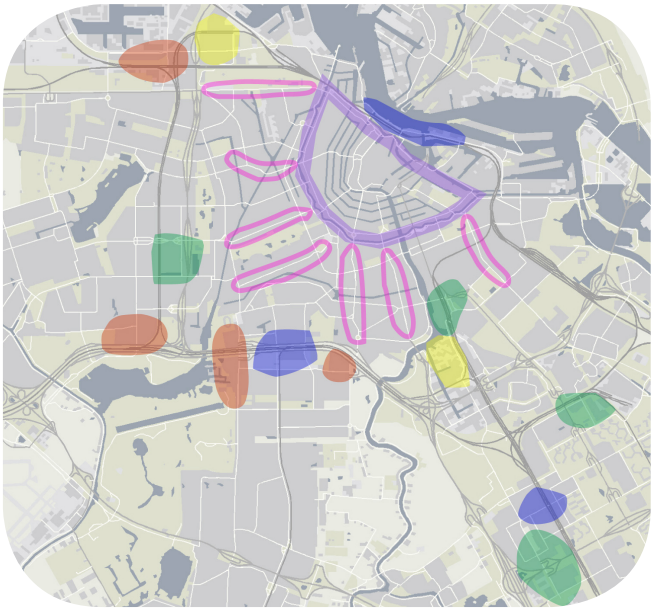


Figure 4.4 Historical office location types in Amsterdam. *Source: Hoek (2007), visualization: author's*

In the development of office sites, there is a shift to be seen from multifunctional office locations (the historical and pre-modern office locations), via the mono-functional office locations (the business and office locations and the 1st and 2nd generation office parks), towards once again multifunctional office locations (the all inclusive environments) In the 2000s (figure 4.5).

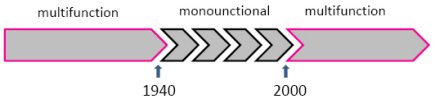


Figure 4.5 Development of function mix in office location.

On the location level, a shift is observable from monofunctional office locations to multi-functional office locations, in which numerous functions are integrated. Besides the shift to more diversity, there is also a shift to be seen from office development accordance with market conditions to office development whereby the focus is on the (final) consumer.

This is converted into architecture of office buildings which represent the identity of the organization (Hoek 2007). This has happened because nowadays is more need for 'custom made' offices for corporations.

The study of Hoek reveals a valuable classification of offices sites by period of construction. Some aspects of office sites such as architecture, connectivity and function mix are discussed per type. However existing office sites are not reflected on regarding their current characteristics. Office sites have been developed over the years and may no longer meet the characteristics described, for instance the function mix that appears to be linked with the periods of construction. To distinguish sites it is therefore relevant to consider their characteristics at a in a similar period, which this thesis pursues.

4.4 The Spacemate

A known study performed on the built environment is the one resulting in the Spacemate. The Spacemate is a tool that includes a method to describe and explain urban density and is developed and described by Berghauser Pont & Haupt (2009).

Berghauser Pont and Haupt claim that by understanding the relation between quantitative and spatial properties, it is possible to define programmatic demands and spatial ambitions simultaneously, without fixing a detailed program or final image for a city or a city quarter. They suggest that a design and planning instrument based on a combination of density concepts could help planners and designers understand the capacity of space and assist in designing appropriate conditions for largely unpredictable developments.

They made use of a mathematical-analytical approach. Where they use quantitative methods for purposes of describing and explaining built form. The focus on the physical, measurable characteristics of built areas. What basically is attempted is to demonstrate a correlation between density measures and urban form. The assumption is that urban density exercises limitations that to a significant degree determine the conditions for urban form. These limitations develop in the context of constraints. Some are geometrical and physical, others are individual (preferences, biography and talents of the designers), or collective (professional doctrines) and many are societal (rules, laws, levels of material wealth and acceptable standards) (Berghauser Pont 2009:107).

Built densities range from spacious rural settlements, through the low densities of the suburban sprawl, via the balanced urbanity of the 19th century expansions to the extremely dense down-towns of the world's metropolises. The individual perception of density can differ completely from density in technical terms (ratios, like buildings per km2).
The authors developed indices in with the density of an area is measured through calculations of information on built form per m2. This method of working with indices FSI (Floor Space Index), OSR (Open Space ratio) and GSI (ground Space Index) describes the floor size of buildings, the site area, the footprint of buildings and the size of the public space. L (Layers) clarifies the amount of floors. These indices are further explained below.

FSI: This index expresses the relation of the amount of built floor area to the area of a plan. The land use intensity is expressed through the building mass per given area. The average land use intensity in Amsterdam lays around 0,9-1,0 and 2,0 forms a maximum for Java Island (IJ-oevers).

GSI: This variable expresses the relationship between built and non-built land, which is called the concept of coverage. It relates to the distribution of (built) mass and open space. In the Netherlands, coverage is used in zoning plans (bestemmingsplannen) to regulate maximum utilization of an area. From the urban fabrics in Amsterdam 0,3 can be considered average, while 0,55 forms a maximum in the Jordaan.

OSR: This index stands for spaciousness which is defined as the relationship between open space and total floor area, as a measurement of the quality of an urban plan. OSR was used as an instrument to stipulate that a development must provide a certain amount of open space on a zoning lot in specified districts in New Work (Berghauser Pont 2010). It can be viewed as an expression of the trade-offs between the desire to maximize the building bulk (program or FSI) and the public and private demand for adequate open space. The average value for areas in Amsterdam is around 0,6, while Betondorp in the north of Amsterdam has an OSR of approximately 1,2.

Layers: This aspect of the Spacemate represents the average building height (L). The average building height of different urban areas in Amsterdam is 4,0 floors, the maximum value lies around 8,0 for the Bijlmer area.

The authors managed to bring these indices together in a diagram. The four indices are positioned on the different axes and by filling in the data of different areas, they can be compared by means of this diagram.

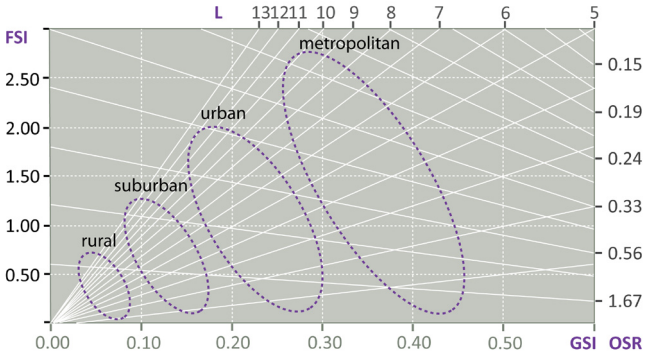


Figure 4.6 The Spacemate with density zones

Source: Berghauser Pont & Haupt (2009)

In the spacemate, figure 4.6, four zones are drawn in which classify urban environments based on the density indices. The lowest density values form the indices belong to rural areas. As the density values increase, towards the right upper corner of the matrix, the areas can be further typified as suburban, urban and metropolitan. The positioning of areas in the diagram enables clear comparison and type composition. Density aspects of the case studies in this research will also be calculated.

An important - and problematic – aspect of the employment of the Spacemate is the definition of the boundary of an area, as this, to a large extent, determines the outcome of density calculations. Although it is common to distinguish between net and gross density, the definition of net and gross varies from place to place, and has been a source of great ambiguity (Berghauser Pont 2009). It is of importance to describe a clear set of definitions for these boundaries. Most important, however, is to be consistent when comparing different areas with each other.

The Spacemate is therefore a good precedent for this research. The authors searched for a method to describe urban form through density aspects and managed to represent the findings in a clear way, through the Spacemate.

4.5 The Mixed-Use Index

Hoek (2008) developed a tool for urban planning and analysis which is called the Mixed-use Index (MXI). The spatial programmatic organization of cities is the starting point of the index.
The author argues that the tool is applicable to the transformations of production or recreation areas into new territories. These urban transformations have in common that they are aimed at creating attractive urban environments reminiscent of the classical European city with equal amounts of housing amenities working and public space within a walk-able territory in order to create liveliness, urbanity and a dynamic diversity. The working facilities in these new urban projects are aimed at the knowledge based economy. Because citizens of today Hoek proclaims, pursue an “all inclusive” metropolitan lifestyle. So what do these transformations imply regarding spatial aspects?

Different uses have been reduced to a combinations of three elementary urban uses: housing, working and amenities. All urban functions can be related to one of the three categories. The difference between working and amenities is that amenities have more visitors than workers. Hoek made a rudimentary index of mixed use that can be defined by the functional balance between the amount of floor space of housing, working, and amenities on the scale of the urban neighbourhood. The MXI could be a useful tool in defining constraints for urban (re)development to come to “all-inclusive” environments.

The idea behind the approach of using the mix in terms of floor spaces is that the amount of specific activities in an area generally corresponds with the amount of specific floor space (Hoek 2010).

That shift in planning of urban areas with an emphasis on the mixing of different functions is evident. However what is a ‘good mix’ in an urban area? Hoek (2010) claims that if an area has three equal amounts of each function one can expect a diverse and lively area. The spatial character of an area is also highly influenced by mixed uses and the way these are organized in urban forms and expressed in individual buildings.

$$MXI \approx \left(\%HOUSING \,/\, \%WORKING \,/\, \%AMENITIES \right)$$

Figure 4.7 Definition of the MXI
Source: Hoek (2010)

What is highly relevant to this study is that van den Hoek tries to make function mix typologies measurable and indexed in an easy way. The functional mix of an urban district forms the essence to be indicated. The MXI expresses this by percentage housing, working and amenities of the total functions in a certain area (figure 4.7). Since the MXI is a quantitative tool, it was possible to make a diagram in which three types of function mix are indicated: monofunctional, bifunctional or mixed (figure 4.8). The different angles represent the tree different uses. A division of areas in Amsterdam into 313 spatial entities of Amsterdam was used for analysis by Hoek and represented in the diagram, figure 4.9.

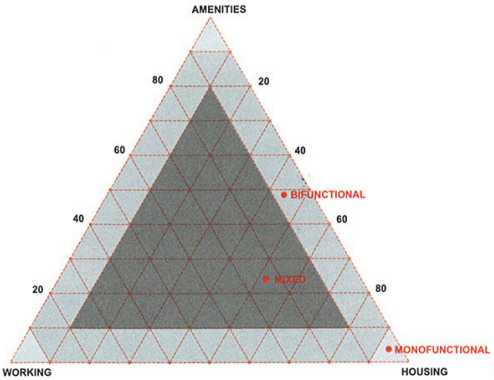


Figure 4.8 Ternary diagram: monofunctional, bifunctional and mixed. *Source: Hoek (2010)*

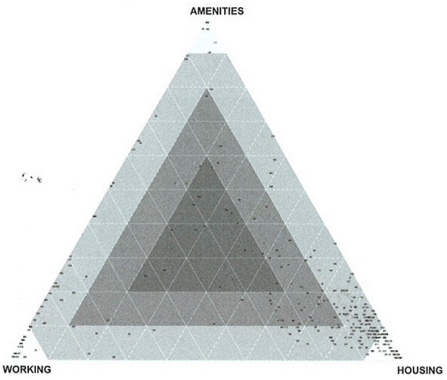


Figure 4.9 Samples in the ternary diagram *Source: Hoek (2010)*

From the analysis of all the 313 entities Hoek draws conclusions based on seven types of urban types he distinguishes. For every urban type an example is taken, which are being analysed based on four parameters: grain size, centrality, density and MXI. See figure 4.10 and 4.11.

It is interesting to learn that by limiting options to certain parameters and through combinations of these, types can be assigned to districts. This approach could also be valuable in assigning types to office sites. The different urban typologies are analysed and represented in the ternary diagram. This is an interesting way of representing information on urban characteristics in an easy way.

	Historical city center	Canal zone	Nineteenth-century extension	Post-war working areas	Post-war neighbourhood	Ring areas	Contemporary harbour restructuring
Example	Damrak Redlight District	East & West Canal zone	Pijp Oud-Zuid	Sloterdijk Teleport	Amsterdam-West Buitenveldert	Ring West Ring Zuid	Eastern harbour islands
Grain size	small	small	medium	large	large	large	medium
Centrality	high	high	medium	low	low	medium	medium
Density	high	high	medium	low	low	medium/ low	medium
MXI*	29/20/51	50/29/21	76/12/13	89/3/8	0/85/16	29/53/18	80/11/9

* Aggregated mix proportion Housing/working/amenities

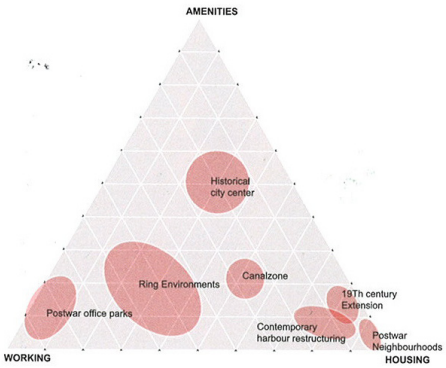


Figure 4.10 Urban typologies and their MXI positions (left). *Source: Hoek (2010)*

Figure 4.11 The MXI of seven urban typologies (right). *Source: Hoek (2010)*

This analysis explored whether measuring the urban mix in percentages could typify urban areas. It certainly does in the way is illustrated before, but there is no such thing as an ideal mix. Every location and every project has its own specific mix potential.
Hoek expects that once a refined correlation between characters of urban typologies and the MXI are established, the Index can develop into a general approach defining urbanity and urban character.

The classification of functions in areas in only three parts (housing/working/amenities) can be considered too limited. For this research it is also interesting to learn about the quantity of office space in an area. Therefore the component 'working' will be subdivided in business and offices. This tool certainly offers basic principles to distinguish office sites on and even develop further.

4.6 Spatial Categories

The dissertation of Rocco (2007) is relevant for this work since it used spatial categories to identify location patterns of corporations. He has looked for location patterns of large producer services in the region of Randstad and Sao Paulo.

In the new network city-region the agglomeration of advanced services can no longer be identified with the 'centre' of cities. The monocentrical model is no longer suitable to explain spatial patterns unfolding in developed countries in Western Europe, North

America and Japan. Modern cities are essentially polycentric and are increasingly inserted in complex polycentric inter-urban compositions, like technical infrastructures, the so-called city-regions (Rocco 2007).

Different business hubs can be interconnected and form a city-region. Business hubs function, as Rocco states, as 'dynamos' being fed by flows running along the main connectivity infrastructure and work as amplifiers and distributors of economical, financial and management flows. Some general trends in location patterns that were found in this context are the ones given next. These concern the trends of large advanced producer services (APS) since these were subject of the study (Rocco 2007):

- Easy access to other nodes in distinct networks (the ring factor). This is coherent with the networked nature of work and knowledge flows in the service sector.
- Easy access to large transportation nodes (airport factor).
- Clear connection to old centralities where consumer services and producer services are concentrated (the urban 'buzz').
- Image is a crucial factor. Corporate image is not only associated to buildings, but also to the image created by modern, daring and innovative urban milieus (the corporate image factor).

These are just few general conclusions, the research was more extensive. However these are interesting findings on the preferences for locations of large corporations, which generally settle their premises in existing office sites. We can read form this that connectivity is an important aspect as well as the availability of transportation nodes. The urban 'buzz' has to do with the presence of different functions that attract a public, which results in lively areas. Image is a factor that is essential for large corporations nowadays. By means of architecture corporations distinguish themselves and reflect corporate image (Geerts 2008).

This analysis was performed based on spatial categories. Rocco (2007) used the following location indicators for his study.

1. Mobility and accessibility to and from identified clusters, measured through presence of mobility infrastructure, public transport systems and relative proximity to large transport hubs, such as airports.

2. ICT structure, measured through mapping of the location of MANs (metropolitan Area Networks)

3. Socio-economic make-up of target areas and adjacent areas, relative to income, education and employment.

4. 'Creativity', measured through the proximity or clustering of creative' industries and services in and in relation to target areas, measured trough mapping of universities, museums, research centers and other relevant cultural activities.

5. Agglomeration of sophisticated consumer's services, measured through the mapping of commercial activity and location of shopping malls.

6. 'City elasticity', that means, spatial opportunities for the development of Large Urban Projects for renewal and strategic development, measured through previous existence of brown fields and existence of large urban projects.

7. Real estate market: land price and office space measured through data about land value in the core municipality.

8. Image: refers to a subjective perception, a representation of places by investors and consumers.

Through the following figure is attempted to abstract parameters that have been studied from the spatial categories.

Spatial Categories	Parameters for analysis
1. Mobility & Accessibility	- Clusters
	- Infrastructure
	- hubs
2. ICT structure	- MAN's
3. Socio-economic	- Demographic statistics
4. Creativity	- Cultural functions
5. Agglomeration	- Commercial functions
6 .City elasticity	- Urban development
7. Real estate market	- Land prices
	- Office space m^2
8. Image	- Architecture, building characteristics

Figure 4.12 Parameters derived from spatial categories

3 PART
Analysis of Office Sites

This part of study concerns the analysis of case studies by means of spatial parameters.

Chapter 5, analysis framework, lays the foundation for the analysis and results of the research. From literature on organizational and spatial typologies an approach to the development of typologies is defined. The spatial parameters for analysis are also derived from the theoretical input.

The case studies that will be object of analysis are selected and described in chapter 6, case studies in Amsterdam. The case selection is set forth in detail; which led to the selection and demarcation of nine office sites in Amsterdam. Each site is described and illustrated.

Chapter 7, analysis of office sites, is where the actual analysis of office sites takes place. Per parameter characteristics of office sites are calculated, illustrated and compared.

5. ANALYTICAL FRAMEWORK

5.1 Approach to developing Typologies

The analysis framework lays the foundation for the analysis and results of the research. This is developed by answering the two sub-questions of research. The two questions help in defining the main elements of the analysis framework: the definition of an approach for the development of a spatial typology and identifying the spatial parameters for analysis. The first sub-question is oriented at the essence of typologies and how to construct these, since that is of aim in this research:

What is the purpose of typologies and what are essential elements of these?

To answer this question theory on both organisational and spatial typologies is used. From both sorts of typologies the purpose and elements were examined.

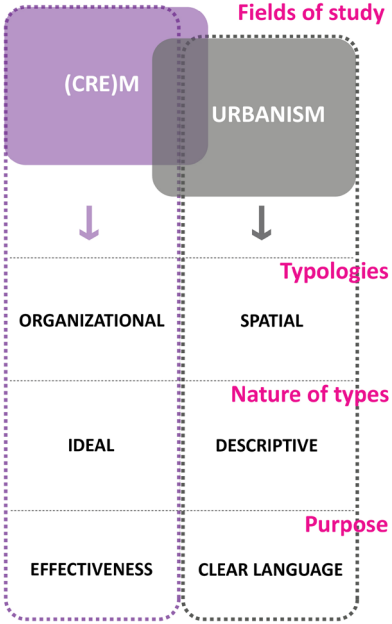


Figure 5.1 Characteristics of organizational and spatial typologies

Organisational typologies

A typology in this research is defined as the study or systematic classification of types that have characteristics or traits in common (TAHD 2009). In management literature typologies are often characterized as classification schemes. Classifying organisations (or other subjects) into types presents an alternative to the idea that organisations are either all alike or are all individually unique.

Typologies in the field of (corporate real estate) management are frequently aimed at differentiating ideal organisational types. The main purpose of these typologies is to define types of ideal organisations through which higher effectiveness of corporations can be achieved. Every ideal type is a unique combination of organisational design and contextual factors (Mintzberg 1979, 1983). Organisations that approximate one of these ideal types are expected to more effective than other organisations.

Theory on these typologies indicates that certain elements should be incorporated in a typology (Doty & Glick 1993:245). This concerns the next elements:

1. A clear purpose for the typology;
2. The definition of a discrete set of types;
3. Types exist of constructs based on the same parameters;

Spatial Typologies

Spatial typologies are, in contrast to organisational typologies, aimed at achieving a certain effectiveness by means of ideal types. Topology studies regarding the built environment have a descriptive nature. These studies concern bottom-up approaches which aim at classifying the built environment rather than defining ideal types for certain urban notions.

Spatial typologies are successful as communicator and often applied in policy making. Typologies create a language that is understood by stakeholders when trying to convey a message. Those typologies used in spatial policies primarily have an analytic purpose. They help identify spatial patterns and hence provide policies with basic knowledge. The instructive aspect of current spatial typologies is that these are often very clear, readable and usable through the abstraction to a diagram in which the components of the studies come together.

These are relevant aspects of spatial typologies in addition to the elements derived from organisational typologies:

4. Abstraction of complex urban concepts (Berghauser Pont & Haupt 2009);
5. Creation of classification scheme for combination (Cuperus 2002);
6. Identification of decisive parameters (Berghauser Pont & Haupt 2009).

From the elements of both organisational and spatial typologies we define an approach to develop a typology, as this is the aim of this research. The next main steps are defined and illustrated in figure 5.2.

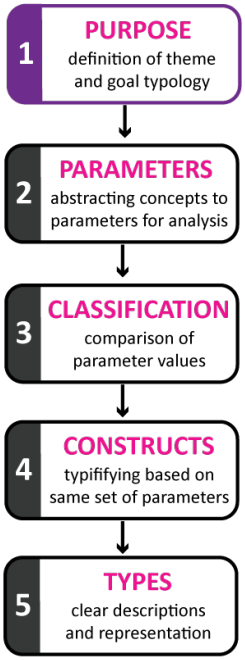


Figure 5.2 Approach to developing typologies

1 **PURPOSE**. The definition of the subject for type construction and its purpose should be clearly defined as to avoid confusion regarding the employment of it.

2 DEFINE ABSTRACT **PARAMETERS**. A necessity is the abstraction of relevant urban concepts to parameters, since descriptions that are too detailed leave little space for type constructions.

3 **CLASSIFICATION** SCHEME. As classification is the condition for combinations; it is therefore essential to develop a classification method for parameter aspects.

4 CONSISTENT **CONSTRUCTS.** It is important to identify the decisive parameters to enable creating constructs based on the same parameters. In order that types can be distinguished on the same set of spatial characteristics.

5 DEFINITION AND REPRESENTATION OF **TYPES** Clear descriptions and illustrations of the distinguished types enable recognition of types and support a clear language regarding the theme.

The **PURPOSE,** highlighted in figure 5.2, of this study has been defined in the first chapter; this research aims at distinguishing types of office sites based on spatial parameters. A certain typology clarifies the notion office sites and enables a language of speech regarding the subject.

The second step, DEFINE ABSTRACT **PARAMETERS**, in introduced in the next paragraph and further discussed in chapter 7 where parameters are operationalised.

5.2 Derived Parameters

The second sub-question of this study will be partly through literature:

Which spatial parameters could be relevant to distinguish office sites? Which (of these parameters) are decisive in the assignation of office site types?

The backbone of this research lies in the analyses of office sites based on spatial parameters. Findings in literature of the studies on built form that are discussed in the previous chapter have to a great extent led to the definition of parameters. The studies revealed

the use of several parameters for typologies. From these and from the problem definition seven parameters have been identified as relevant which will enable the comparison of office sites and lead to type construction.

Figure 5.3 Seven parameters for analysis

Next, the spatial parameters are defined more extensively in relation to the analysis of office sites.

POSITION | This parameter concerns the position of office sites towards the city center. This is a relevant aspect in characterizing an area since it expressed the relative location in a city. The method for this parameter is defined regarding the situation of Amsterdam, from which the case studies will be selected. The ringway A10 in Amsterdam is considered an historical border, started in 1962 together with postwar districts outside the ring. This will be used in the analysis by means of this parameter. The distance of the Dam square, starting point for street numbering in Amsterdam, to each office site is measured.

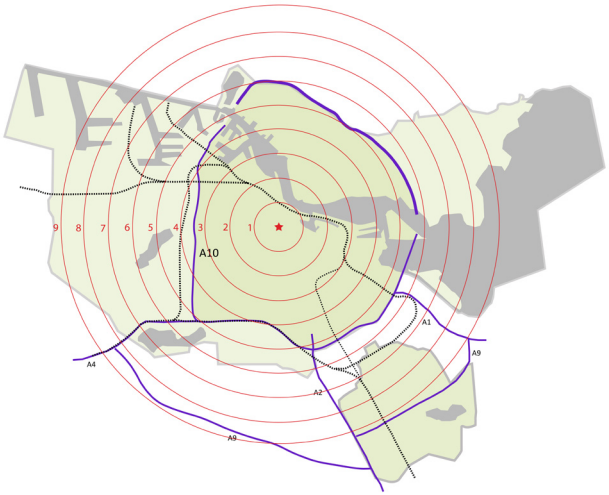


Figure 5.4 Central, ring and peripheral position in Amsterdam and km circles

NODES

NODES | This parameter relates to the accessibility and connectivity of a certain area by public transport. As shown from the study of Rocco (2007) the availability of transportation or a public transport hub is important. Being near to attractive recreational areas such as the city center is nowadays less important. The degree of connectivity is more important for this matter, as distances are to no longer expressed in meters but in minutes.

A transportation node is defined as a junction of different types of public transport. At least three of the next types of public transport should be available: train, metro, tram and bus. Single bus or tram stops are not considered as nodes, but are being considered to determine the overall accessibility of office sites by means of public transport.
Highway connections are very important for office sites as well. However in a city with the (compact) size and infrastructure of Amsterdam, every office location is well connected with either the ring way A10 or another high way (for example A4). In the figure below the railway with main and smaller train stations are indicated. The different bus and tram within 250 meters outline (refers to walking distance) of an office site will considered as well.

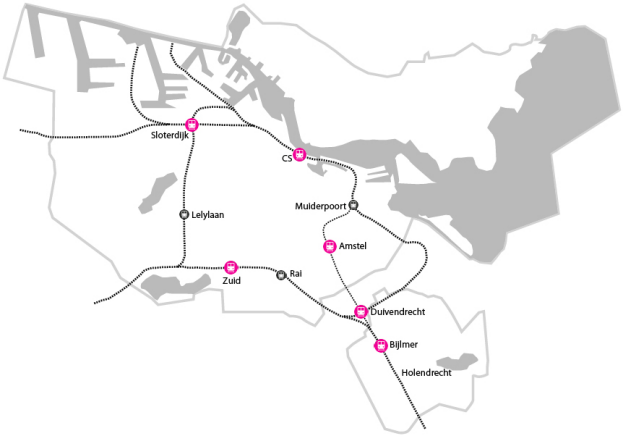


Figure 5.5 Nodes and railway in Amsterdam

PERIMETER | This parameter is about the perception of a perimeter (border) around an area in any possible form. As discussed in the problem exploration corporations are often considered as introvert, focusing on benefits only and protecting their intellectual property. They strictly manage the corporate boundary and the interaction with the corporate environment (Vande Putte 2009:49).

Implications of these characteristics could be the presence of a perimeter in office sites. It is interesting to learn how these aspects are manifested in physical form. The emphasis is not so much on the existence of a physical border like a fence or a wall, but rather on the concept of perception of a border. A border can be perceived because of morphological features such as density and grain size of buildings. Office site can also be bordered by infrastructural elements as highway, railway or water

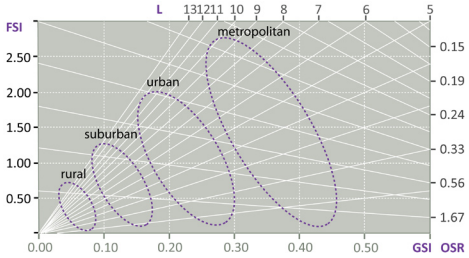


Figure 5.6 Spacemate with density zones.
Source: Berghauser Pont & Haupt (2010)

DENSITY | This physical aspects will be incorporated in the analysis to compare information on the morphology of office sites. This parameter expresses morphology in terms of density and makes use of the Spacemate (Berghauser Pont & Haupt 2009). For all the office sites the density indices FSI, GSI, OSR and the amount of Layers will be calculated and positioned in the Spacemate diagram.

GRAINS | This parameter is about the spatial aspects of buildings in offices sites indicated through the building size: grain size. Office buildings are nearly all distinct and may still show a typical building size in different sites. This will be measured in average gross floor area of office buildings in an office site.

FUNCTIONS | Rocco (2007) argued that it is valuable to study the (lack of) diversity of functions in areas. He mentioned creative functions and cultural functions. These are important as to enable an urban 'buzz' or lively area which large organisations prefer to be near to.

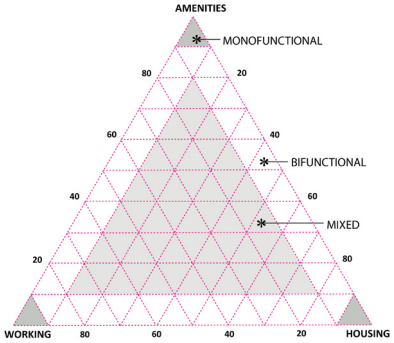


Figure 5.7 MXI diagram with different types of function mix. *Source: Hoek (2010)*

This parameter therefore defines the function mix of office sites. The Mixed Use Index (Hoek 2010) will be used for the analysis, the data on the percentages living, working and amenities is adapted. The function mix is expressed in percentages of a main function in relation to the total amount of built gross floor space in an area. The component 'working' will be subdivided in business and offices.

USERS | Besides the functions is it also of significance to learn what different organisations, or users of offices, are accommodated in an area. There is a variety in sizes of corporations; size by means of amount of employees. A distinction is made between companies with at most 50 employees and those with more than 50. Companies with more than 50 employees can be regarded as office related practice.

An inventory of companies and their size is performed via the register of the Chamber of Commerce (KvK) in Amsterdam. For both the categories of 'unto 50 employees' and 'more than 50 employees' will the number of companies per hectare for each location be calculated

6. CASE STUDIES IN AMSTERDAM

As the purpose of this study is to identify types of office sites, these will be object of analysis. To allow for a first exploration into an office site typology this research will only focus on the office sites in Amsterdam. This city accommodates a variety of office environments. The situation of Amsterdam differs from other cities in the Randstad, since Amsterdam as a capital city and the proximity of the large international airport Schiphol represents a unique (international) office market in the Netherlands.

For the analysis it is necessary to demarcate selected office sites, this way data within drawn border can be examined. The selection and demarcation of case studies is explained in next paragraphs.

6.1 Definition of Office Sites

A fundamental element for this study is obviously the definition of what an office location is considered to be. A clear definition of the term 'office site' cannot be found with market parties that work in the field of real estate. As stated in the problem analysis, market parties such as the real estate agency DTZ annually monitor economical values as vacancy rates and rent levels of offices in different areas within a city and its region. In certain areas, due to the presence of many offices, more statistical output of lease and vacancy is generated. Through this, these locations are recognized as office sites because of their importance to the office market, but without a definition or clear perimeter for the site.

A distinction is made between offices and business space. This research focuses primarily on buildings where activities are carried out that are mainly aimed at (administrative) processing of information. The accommodation of buildings in which the focus lies on the manufacturing, processing or storage of goods are therefore outside the scope of this exploration.

Even though many of the office sites in for instance Amsterdam are planned as such, still there appears to be a general assumption on what office site are. In literature is searched for a definition.

The first definition we come across, is from the Stichting ROZ Vastgoedindex and Investment Property Databank (2007). They handle the next definition for an office site:
'A site on which office buildings are located and which is primarily/exclusively intended and used as office site'.

The Provincie Utrecht (2006) handles an even more specific definition:
'An office site is a parcel or a grouping of contiguous parcels, on which buildings are constructed or may be developed with solely or mainly an office function.' Uncultivated parcels with a destination for office buildings are also included.

The contiguous nature of parcels is essential in the quoted definition. Scattered office parcels in an area are in this publication (Provincie Utrecht 2006) regarded as different locations. This means that only clusters of office buildings are considered office sites. For this research, into a typology of office sites, a necessary contiguous nature will not be adopted. To be able to distinguish types de definition of an 'office site' should not exclude areas with many office buildings beforehand because of this condition. This however does not imply that all areas with some scattering of offices are considered office sites. A threshold of square meters office space is used to select office sites in order to analyse the most prominent office sites in Amsterdam.

Therefore the next definition is handled:
An office location is a site or grouping of parcels where many office buildings are located, with at least 10.000 m² gross floor area of office space within a defined location.

This research does not address single building office locations or areas with only two or three buildings that offer office space.

N.B. The lower limit of 10.000 m² gross floor area is derived from the definition of the Provincie Utrecht (2006). Further, are amenities as hospitals and educational facilities not considered offices, unless all of the administrative activities of it are accommodated in a separate building.

6.2 Selection of Office Sites

Several methods have been explored as means to determine the office locations in Amsterdam in an objective way.

Employment concentration

By means of information on dispersion of employment could be measured in which areas jobs are concentrated. It is expected that concentration of jobs mainly takes place in administrative environments in offices. The job concentration figures are based on data of the Chamber of Commerce (KvK) of registered companies and the number of employees that is employed. The map, figure 6.2.1, indicates were clusters of companies are found. However this information did not provide a good lead for clear demarcation of office sites. The dots represent sizes of organisations, not only office related companies. Universities, hospitals and other health institutions are also included in the map. Furthermore is the statistical data is somewhat biased as many companies have their offices in certain locations, but their employees might be working elsewhere.

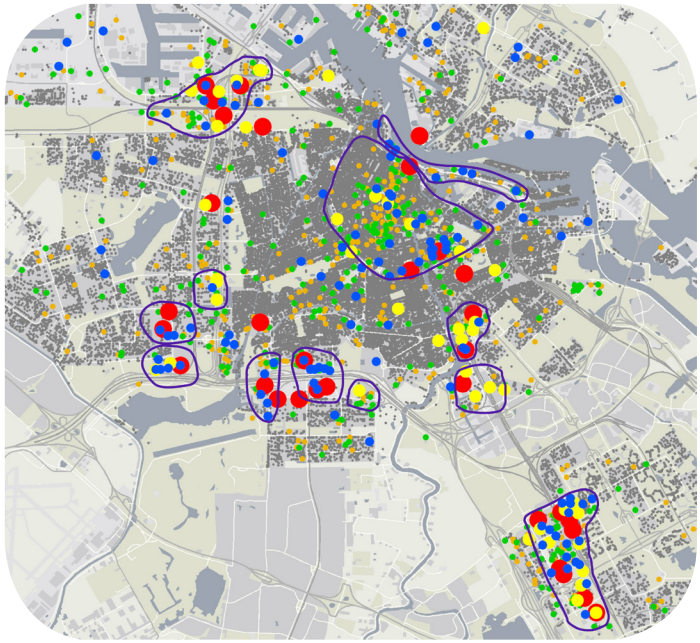


Figure 6.2.1 Clusters of companies based on amount of employees. *Source: Dashorst DRO (2010), adaptation: author's*

Offices clustering

Another method was to examine the distribution of office buildings in the city of Amsterdam. In the next figure the yellow surfaces represent office buildings and the purple objects business activities. This map gives a good indication of the spreading and clustering of offices in an area. In figure 6.2.2 the possible office sites are outlined.

However from only the use of this map it is not possible to conclude on the demarcation of office sites. The office areas with dense clustering of premises can be easily read, but areas where a larger spread is noticeable are harder to define and demarcate.

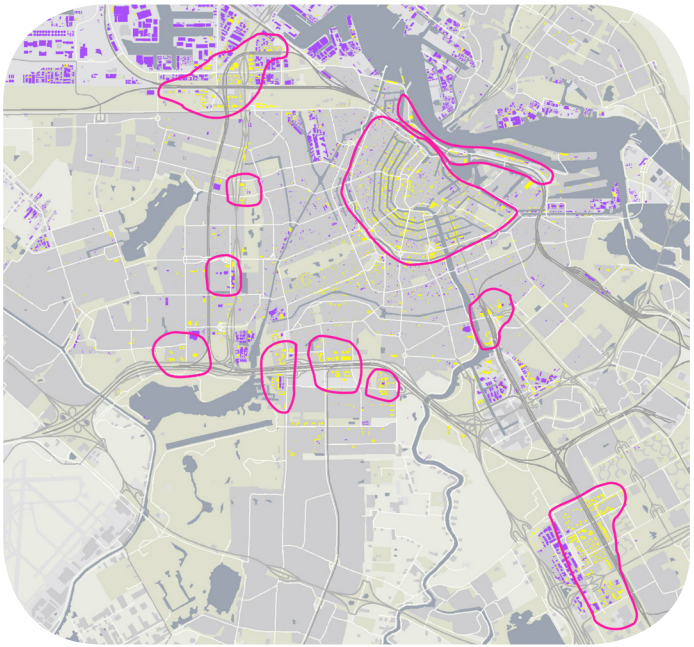


Figure 6.2.2 Offices and business space in Amsterdam. *Source: Dashorst DRO (2010), adaptation: author's*

Publications on offices

To affirm the office sites identified in the previous two maps the notion of office sites is approached from which office sites are identifies by market parties and local government. To detect which office sites are present in Amsterdam and considered as such, some publications are studied. The report We're Amsterdam of real estate agency Boer Hartog Hooft (BHH 2009) in cooperation with tax department (Dienst Belastingen) of the Municipality, concerns studies and updates related to

the office market and the different office areas of Amsterdam. They studied Amsterdam and the adjacent areas like Diemen, Amstelveen, Haarlemmermeer and Almere.

Whithin the different regions of Amsterdam the next office sites are recognized:
Centrum, Amstel (Omval), Sciencepark, Riekerpolder, Teleport, Zuidas, Zuidelijke IJ-oevers and Zuidoost. These correspond with most of the outlined sites in the images.

Science park Amsterdam will not be included in the analysis, because very few of the planned developments have been realized thus far.

6.3 Demarcation of Office Sites

To clearly demarcate office sites another publication is consulted. In the 'yellow booklet', the annual publication of the urban planning department (DRO) and other departments of the municipality of Amsterdam an overview is given of the 'to be developed' office and business space and remaining issuable business and harbor areas in Amsterdam. From this study, in combination with the findings through the clustering maps of employment and offices as well as the office sites named (BHH 2009) in the previous paragraph, the office sites for analysis are derived.

Selected office sited will be demarcated to enable calculations based on data about these sites. The most important aspect to demarcating offices site is consistency. As long as the same methods are handled for bordering all the sites, e.g. excluding highways etc, the data that will be used for these areas is comparable. The borders drawn in this research have been determined carefully, still it is possible that for some areas some office buildings are left out or that some office sites are drawn a bit too wide.

The publication of office and business space (DRO 2010) was leading in determining the borders of the office sites. Maps of the city with the different locations are part of the publication and show borders for many of the office locations based on the zoning plan (bestemmingsplan): the white surfaces mark office sites (figure 6.3). The other locations which are by the municipality not specifically considered as office sites, but by Boer Hartog Hooft and the employment and offices maps have been identified as office sites, have been more difficult to demarcate. Like for instance Centrum and Zuidelijke IJ-oevers. In the case of Centrum the whole ring of canals, which was built as an extension to the medieval city in the 16th century, is eventually considered the office location for study.

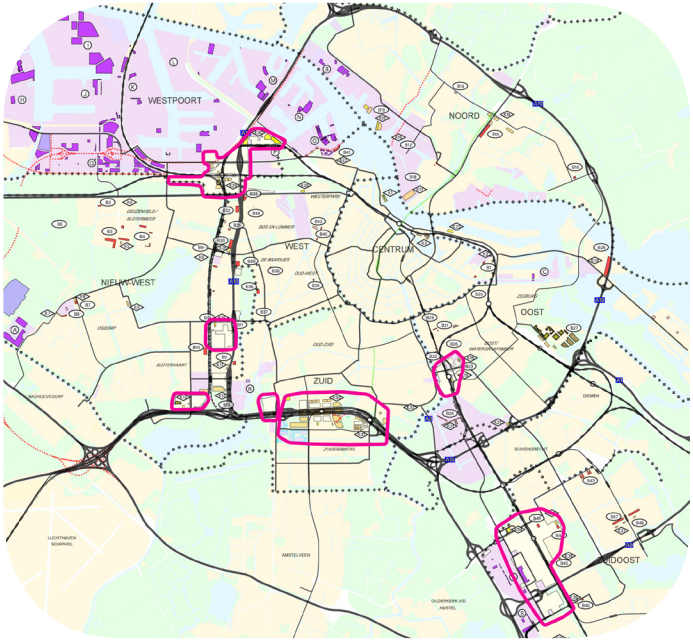


Figure 6.3.1 Outlined demarcated office sites. *Source: DRO (2010), adaptation: author's*

In the demarcating areas the urban characteristics of an area, such as borders by roads, green spaces and water were considered. Uncultivated parcels with a destination for office buildings have been included in the demarcation of office sites.

From the demarcation visible in figure 6.3.1 for the Zuidas a smaller area has been drawn, so as to exclude the hospital VUMC and VU University. At the Westside of the Zuidas another office site is identified. This is a location with many offices, including ING headoffice, The area on the north side of the highway together with the southern part (Zuiderhof) is considered the office sites Zuidflank.

The next demarcated office sites of Amsterdam will be used as case studies:

1. Amstel
2. Centrum
3. Lelylaan
4. Riekerpolder
5. Teleport
6. Zuidas
7. Zuidflank
8. Zuidelijke IJ-oevers
9. Zuidoost

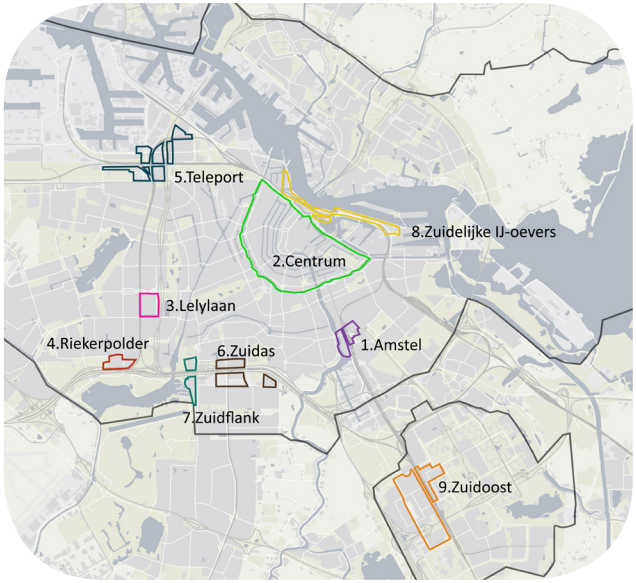


Figure 6.3.2 Selected office sites in Amsterdam.

For some sites the names have been defined based on their location near stations (Amstel) or roads (Lelylaan), so the names may differ from those used in practice.

6.4 INTRODUCTION OF CASE STUDIES

The selected office sites are introduced and illustrated next.

1. Amstel

The surrounding area of the Amstel site had its first office developments in 1942 when the Wibautstraat was build. A famous part of this office location is 'De Omval', this site is located on the Amstel river. In 1987 the municipality of Amsterdam gave permission to construct three high-rise building here, which now characterise this office location (BHH 2009. The Rembrandttoren with 35 stories was finished in 1994; the Mondriaantoren and the Breitnertoren followed in 2001. This part of the location is popular with corporations that provide financial and business services. Also other types of corporations can be found here, for instance the head office of Philips is accommodated in the Breitnertoren. The area is a mixed area with besides offices the educational institution Hogeschool van Amsterdam and other amenities. Furthermore, traditional housing blocks can be found as part of the assigned location.

The Wibautstraat is an import traffic route in Amsterdam. This Axis connects the office site 'De Omval' through the Weesperstraat with the center of the city. The train station Amstel is part of the office area, built in 1939. This is a node for train, metro, tram and an important starting point for long distance bus trips.

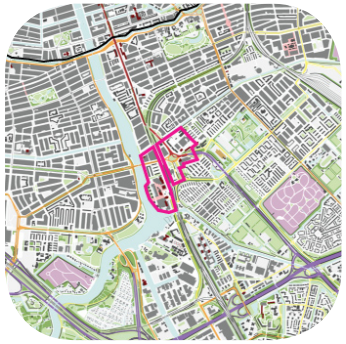


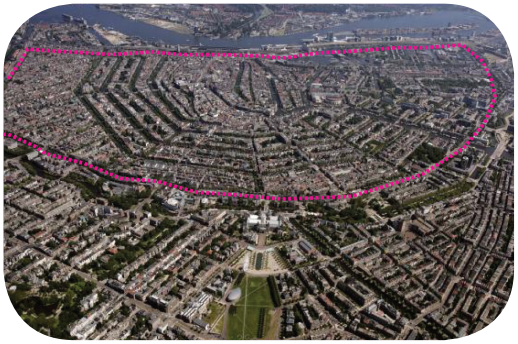
Figure 6.4.1 Map of office site Amstel
Figure 6.4.2 Bird's eye view Amstel

2. Centrum

The Centrum district of Amsterdam is known for the ring of canals which dates from the 16th century and forms the oldest part of the city. This area is characterised by stately mansions that were usually build for wealthy merchants. The buildings nowadays have different destinations, from offices to hotels and dwellings. Regarding new office space in the center of Amsterdam, the emphasis is on redevelopment of existing buildings, rather than new constructions. The area is very popular for smaller companies to accommodate. Currently many of the canal houses accommodate law firms, notaries and offices in the creative sector. Also large corporations prefer to be in mixed areas, but cannot find buildings in which the large required square meters.
This part of the city attract millions of tourists a year from which the most enter the city through this part; from the Central Station. This is the largest node of Amsterdam which has 14 platforms for trains and connects the city as final destination of many trams, buses and three metro lines and in the future the North South line.

This area is very mixed. Besides offices, of a smaller grain size than in other locations, large shopping streets are to be found. Touristic activities take place in this area; the famous Madame Tussaud's has almost one million visitors a year. So this area represents a commercial and cultural zone and the focus is not so much on offices.

Figure 6.4.3 Map of office site Centrum
Figure 6.4.4 Bird's eye view Centrum



3. Lelylaan

On the western part of the ringway A10 several offices are located. Near the exit for the areas Osdorp to the west and Centrum to the east the office site Lelylaan is located. This area is mainly known as the area of the World Fashion Center, which is a large complex in the site with several smaller fashion related companies accommodated in it. Landmarks in this area are the Queens towers direct at the exit of the ringway, designed by Architecten Cie, with the towers Wilhelminatoren, Julianatoren and Beatrixtoren of 10 and 14 stories. Besides fashion related companies there also other companies can be found. Some telecommunications companies have (smaller) buildings on the site. The area is mixed with apartment flats near the metro track on the west side of the area. Amenities are there in terms of educational facilities: three different schools. The site contains uncultivated parcels for which developments are planned.

This office site lies adjacent to the train station Amsterdam Lelylaan. This station is one of the smaller nodes, but still connects different transportation types like metro, bus and tram.

Figure 6.4.5 Map of office site Lelylaan
Figure 6.4.6 Bird's eye view Lelylaan

4. Riekerpolder

In 1991 the Urban Planning department of the Municipality of Amsterdam set up a masterplan for the area of Riekerpolder. In 1999 it gained its final form through a structure plan and the construction could start. The site is located as part of the Schiphol (airport) zone, which is intended for offices and business space for international oriented firms (BHH 2009). The site of Riekerpolder is also called the extension of Zuidas or the gate to Amsterdam en lies at the area where the highway A4 is split into the ringway A10 North and South. The center of Amsterdam and Schiphol are both 10 minutes by car away from Riekerpolder.

Over the years Riekerpolder grew towards a full office park. The largest new development is that of PriceWaterhouseCoopers (PWC) which had, while already occupying around 26.000 m², an extra 25.000 m² build. This in order to cluster all its Amsterdam employees on one location. PWC is the largest user of Riekerpolder. Diverse other leading international organisations are accommodated here, for example: Mexx, NCR, CAN Europe, IBM, Maxeda and PriceWaterhouseCoopers.

Because of the presence of the ringway and immediate access to the A4, Riekerpolder is well connected by car. However to come here by public transport is more difficult.

Figure 6.4.7 Map of office site Riekerpolder
Figure 6.4.8 Bird's eye view Riekerpolder

5. Teleport

The site of Teleport has been developed in the eighties as a telematic cluster, which explains the name Teleport (BHH 2009).
The location of Teleport lies for the largest part outside, but adjacent, to the ringway of Amsterdam. The area profits of a good connection to public transport since it is built around the train station Sloterdijk. The area is also well connected by car; the ringway A10 has a Teleport exit. When the 'Weststrandweg', an extension of the A5 national highway, and the second 'Coentunnel' are ready for use, the area will profit from an even better connectivity by car.

The area is characterised by many large-scale buildings. Recognizable big building in Teleport are for instance 'het Boek' ('the book') which houses the Belastingdienst (tax authorities) and 'het Spiegelpaleis' (the mirror palace) Telehouse, which KPN leaves behind to be accommodated in a new building developed by OVG next to the trains station Amsterdam Sloterdijk. Several other users occupy offices in the area. These are for instance Achmea, UWV, GVB, Kadaster, Elsevier, BPF Bouwinvest, Deloitte, Oracle and De Telegraaf (BHH 2009).
In the area are mainly office buildings available, all with different enterprises. Apart from office functions there are no other functions to be found in the area. Outside the working hours the area is completely deserted. Living in this area is almost impossible because of noise nuisance of the port, trains and highway.

Figure 6.4.9 Map of office site Teleport
Figure 6.4.10 Bird's eye view Teleport

6. Zuidas

The Southern section of the ring A10, where the latest office hub Zuidas is located, was not completed before 1981. The first large business tower in the area predates the complexion of the ring (Atrium office building, concluded in 1974). The construction of the first business towers belonging to the World Trade Centre Complex. The train station known as Amsterdam Zuid was opened in 1978, connecting the area to the Schiphol Airport. After these scattered developments the decision of the major multinational Amsterdam based ABN AMRO Bank in the mid 1990s to combine various scattered offices in a new headquarter at Zuidas, was the breakthrough for the new development area.
The developments at this location were initially lead by the market, regulated by a modest city planning. It was because of the official start as “key project”, stimulated by the municipality in Amsterdam in 1997, that the development grew substantially with the accommodation of the international financial and legal service sectors.

The train station Amsterdam Zuid is at the heart of the location. Not only does it provide for a fast train connection with Schiphol Airport, also does it connect the city center with the location through metro and tram en other parts of the city as well by bus. Then there is also the smaller train station Amsterdam Rai adjacent to the area. The surrounding areas are mainly living areas or business locations which primarily consist of three to four floor buildings in contrast to the highrise buildings of the Zuidas.

Figure 6.4.11 Map of office site Zuidas
Figure 6.4.12 Bird’s eye view Zuidas

7. Zuidflank

This area consist of two parts divided by the ringway A10 and lies west of the Zuidas area, but does not form a part of that area. In the northern part of this site two complexes of the architect Aldo van Eyck are located. The Burgerweeshuis was finished in 1961, designed as orphanage. Today this is no longer the function of this complex. Adjacent to this project lies the office complex Tripolis from van Eyck, designed in a similar style, but finished more than 30 years later in 1994.
This office site lies strategically at an exit of the ringway, which makes it very accessible by car. The most characteristic building of the area is the ING House, famous for its landmark architecture. The area consists mainly of office sites with some amenities, like sports facilities, spread around. The companies accommodated in offices are average sized organisation like DLA Piper and a back office of ABN Amro.

There is no train station adjacent to the office site, Amsterdam Zuid would be nearest. The site does have a metro stop which forms a node for also trams and buses.

Figure 6.4.13 Map of office site Zuidflank
Figure 6.4.14 Bird's eye view Zuidflank

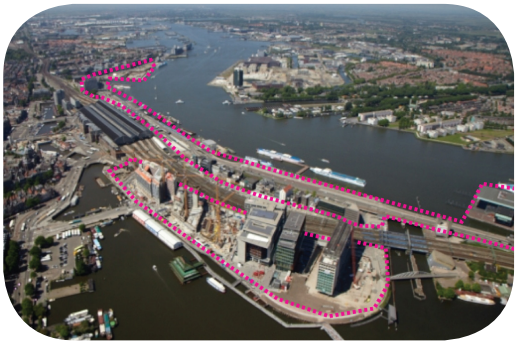
8. Zuidelijke IJ-oevers

This office site lies on the northern side of the Central Station in Amsterdam at the south bank of the river the IJ, from which the name of the area is derived. The area of the Zuidelijke IJ-oevers is in development for many years now, it is increasingly becoming a lively area with an urban environment and a large mix of functions like dwellings, restaurants and offices. The site Zuidelijke IJ-oevers consists of some parts: Oosterdok, Wester IJDock, Westrdokseiland, Piet Heinkade en de IJzijde.

Some known users of buildings on the Piet Heinkade are Ymere, Ahold, Philps, Vesteda and Smeg. Besides the many warehouses there also other remarkable buildings like the modern concert hall Bimhuis and the Mövenpick hotel. At this moment the largest developments take place on the Oosterdokseiland and the Wester IJDock. The latter is a peninsula west of Central station where government functions as the Court of Justice (Gerechtshof), Prosecutors office (Ressortsparket) and the national police (KLPD) will be accommodated.

Figure 6.4.15 Map of office site Zuidelijke IJ-oevers

Figure 6.4.16 Bird's eye view Zuidelijke IJ-oevers



9. Zuidoost

The office location in Amsterdam Zuidoost (south east) is part of a large working area in Amsterdam. In the whole area (including business functions and hospital AMC) work around 30.000 people. After the Centrum area of the city this area offers the most employment. Mainly corporations providing business services and financial organisations are accommodated in this office area. High end office buildings are realised and also some main amenities can be found.
Since the opening of the soccer stadium Amsterdam Arena many other developments in the area were launched. More offices were built and now large amenities like the Heineken Music Hall and Pathe cinema are part of the area. The amenities lie very concentrated, which makes them not within walking distance for most offices. The largest part of the area is very monofunctional, areas with different functions are juxtaposed.

The train station Amsterdam Bijlmer lies in the office site near the amenities. This train station has been expanded in 2007 with more train tracks, so it now handles more trains and also intercity trains, towards Utrecht for example. This station is an important node for the area, since it brings together all types of public transport.

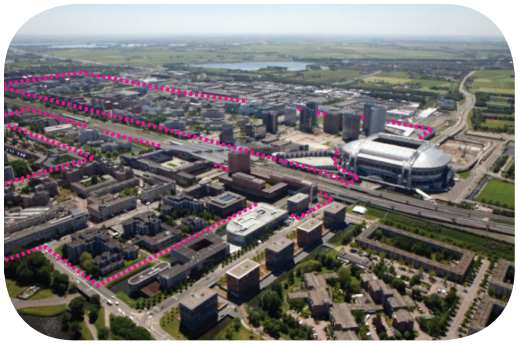


Figure 6.4.17 Map of office site Zuidoost
Figure 6.4.18 Bird's eye view Zuidoost

7. ANALYSIS OFFICE SITES

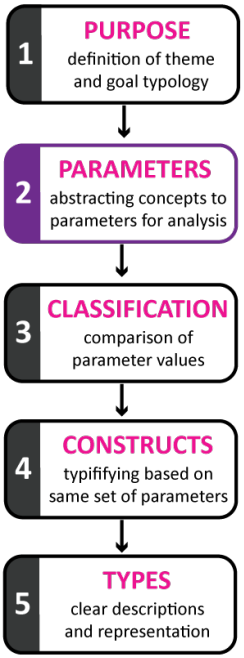


Figure 7.1. Approach to developing typologies

In the previous chapter the nine defined office sites have been introduced and their characteristics have been described. This chapter sets forth the analysis of these site based on the seven derived parameters for analysis. An important step (figure 7.1) in developing a typology is the abstraction of concepts. All parameters have been operationalised into a method that allows to explain the characteristics of each office site and compare them. For nearly all parameters this concerns a quantitative method, other parameters are visualized to show certain characteristics of the investigated office sites. The method POSITION is defined based on the spatial outline of Amsterdam, other parameter methods are more generic.
For the parameters there could possibly be several other ways to express them. After some other attempts, based on available data, the next described methods were found most suitable for comparison.

In order to compare the office sites, to each parameter will be assigned three values based on the analysis method. This will be done by assigning bandwidths to the outcome of the methods. These values will serve as input for classification methods which will be explained in the next chapter. Using more or different sites may deliver another range of outcomes and thus can the bandwidth be defined differently.

7.1 Position

This parameter concerns the position of office sites towards the city center, where the urban 'buzz' is considered to take place. This is a relevant aspect in characterizing an area since it expressed the relative location in a city. This is expressed in distance (meters) from the Dam square to the office site, shown in next table. To the measured distances are bandwidths assigned to obtain matrix values. These bandwidths, as shown in table 7.1, define three parameter values for POSITION: **central**, **ring** or **peripheral**. A central position refers to a location within the ringway A10, ring represents sites adjacent to the ringway and peripheral indicates that a site is located outside the ring.

	POSITION	BANDWIDTH	MATRIX VALUES
Amstel	3500 m	unto 4000	central
Centrum	1000 m	unto 4000	central
Lelylaan	4300 m	4000 to 6000	ring
Riekerpolder	5500 m	4000 to 6000	ring
Teleport	4100 m	4000 to 6000	ring
Zuidas	4400 m	4000 to 6000	ring
Zuidflank	4800 m	4000 to 6000	ring
Zuidelijke IJ-oevers	2000 m	unto 4000	central
Zuidoost	8200 m	unto 4000	peripheral

Figure 7.1.1 POSITION of office sites in Amsterdam

The next image depicts the different office sites and their position towards city center and ringway. The red rings represent the number of kilometers from the Dam square. This parameter shows that the distance from the office sites to the city center differs, but that many of the sites are located near a highway, mainly the ringway A10. The development and the connecting capability of the ringway A10 is related to the construction of sites like Teleport, Riekerpolder, Zuidflank and even Zuidas. The construction of the ring A10 was started in 1962 (Rijkswaterstaat 2010).

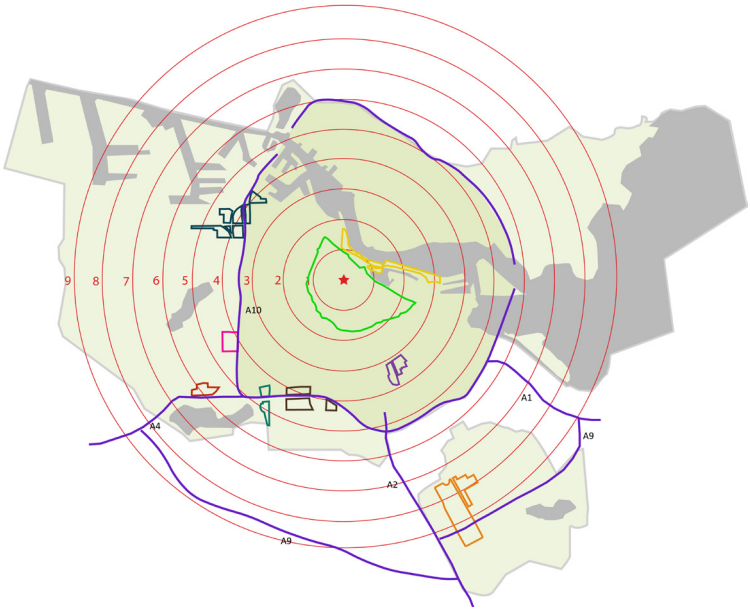


Figure 7.1.2 POSITION of office sites towards the city center

7.2 Nodes

With a quantitative approach of the parameter NODES is tried to express the term 'connectivity'. By exploring which types of public transport and how many stops are near an office site, is calculated to what extent an office site is connected.

For every office site an outline of 250 meter from the demarcated border is drawn. This distance is handled because it conveys the walking distance to an office location. Within the drawn outline is surveyed how many stops are available of every public transport type: train, metro, tram and bus. The amount of stops per type is summed up per office site. Then a weight was assigned to every type of public transport, this is done to express the importance, reach and amount of passengers of every type of transport. The weights are relative numbers, the importance of every type of transport can be compared this way.

- The **TRAIN** received a weight of either 5 or 4, since this types has a large reach, high speed and is able to carry a relative large amount of passengers. The distinction between 5 or 4 is determined by the importance of the train station. This is based on a study on the yearly amount of travellers in 2006 that got in and out of a train at a certain station (Treinreiziger 2006).

Train station	2004	2005	2006
Amsterdam Amstel	17323	18589	19350
Amsterdam Bijlmer	7649	8026	10827
Amsterdam Centraal	145093	149231	156452
Amsterdam Lelylaan	8796	9243	9779
Amsterdam Muiderpoort	6650	6578	7378
Amsterdam RAI	6581	6103	5857
Amsterdam Sloterdijk	33086	35720	39555
Amsterdam Zuid-WTC	16443	22883	25441

Figure 7.2.1 Travelers information of stations in Amsterdam *Source: Treinziger.nl 2006*

The large nodes are: Amsterdam Amstel, Amsterdam Centraal, Amsterdam Bijlmer, enlarged in 2007 (Arena boulevard 2010), Amsterdam Sloterdijk & Amsterdam Zuid. The relative smaller train nodes are: Amsterdam Lelylaan, Amsterdam Muiderpoort & Amsterdam Rai.

- The **METRO** follows with a weight of 3. The metro is a combination of train and

tram, has an own track through the city by which it is usually not bothered by other transport in the city.

- The BUS and TRAM can be considered the same in terms of connectivity and are weighted 1.

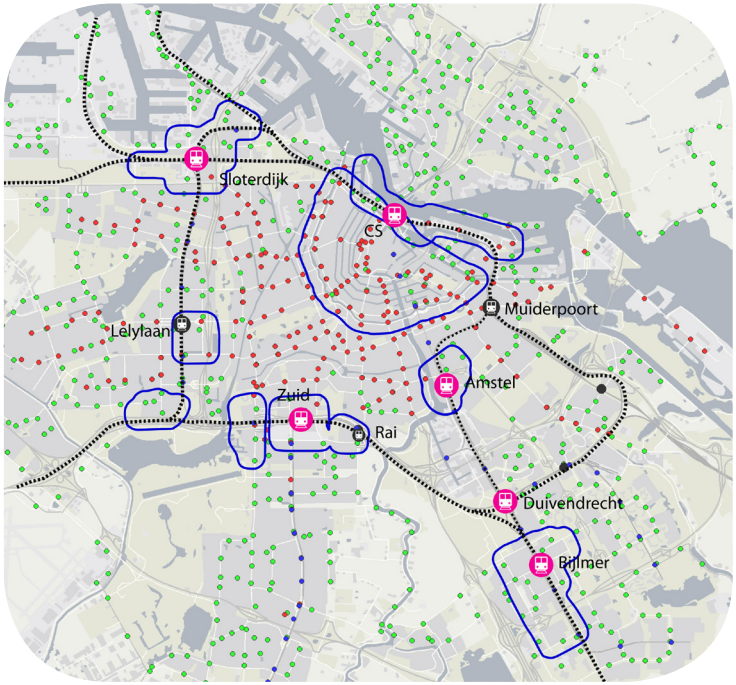
Then, the amount of stops is shown in table per transportation types. Then, the number of stops is multiplied by its weight number and all outcome per public transport type is summed for every office site (column TOTAL). This total articulates the connectivity for an office site. However since the sites differ in size, the connectivity is expressed per hectare. The result is a Connectivity Index which expresses the connections per hectare for each office site.

	TRAIN large	TRAIN small	METRO	TRAM	BUS	TOTAL	SIZE	CONNECTIVITY INDEX	BANDWIDTH	MATRIX VALUES
Weight →	**5**	**4**	**3**	**1**	**1**		**ha**	Total/size		
Amstel	1		2	2	7	**20**	31	**0,65**	from 0,5	good
Centrum	1		4	60	36	**113**	576	**0,2**	unto 0,3	poor
Lelylaan		1	2	4	5	**19**	32	**0,59**	from 0,5	good
Riekerpolder					4	**4**	23	**0,17**	unto 0,3	poor
Teleport	1		2	3	11	**25**	91	**0,27**	unto 0,3	poor
Zuidas	1	1	3	4	7	**29**	54	**0,54**	from 0,5	good
Zuidflank			1	3	5	**11**	23	**0,48**	0,3 to 0,5	average
Zuidelijke IJ-oevers	1		1	7	9	**24**	58	**0,41**	0,3 to 0,5	average
Zuidoost	1		3		14	**28**	156	**0,18**	unto 0,3	poor

Figure 7.2.2 Calculations NODES through Connectivity Index

Three bandwidths are then assigned to the Connectivity Index to define matrix values and compare the office sites. A **good** connection has a value of 0,5 or up, an **average** connected area between 0,3 and 0,5 and a **poorly** connected are scores 0,3 or less in the Connectivity Index. The Amstel site appears to be best connected, the Amstel strain station is located within site borders and offers more connections. Centrum has a poor score, this is because the area is very large and there are many tram and bus stops in the area, but these are weighted less than other transportation types. Other sites are not located near an train node which can be traced back to their values of the connectivity index.

The spatial distribution of nodes and public transport stops is illustrated in the next image. The outlines of 250 meter for every office site are drawn in blue.



PUBLIC TRANSPORTATION STOPS

- Train - large
- Train - small
- Metro
- Tram
- Bus

Figure 7.2.3 Office sites with 250 m outline and public transport stops

7.3 Perimeter

PERIMETER

This parameter is about the perception of a perimeter (border) around an area in any possible form. Corporations are often considered as introvert, focusing on benefits only and protecting their intellectual property. They strictly manage the corporate boundary and the interaction with the corporate environment (Vande Putte 2009:49).

Implications of these characteristics could be the presence of a perimeter in office sites. It is interesting to learn how these aspects are manifested in physical form. The emphasis is not so much on the existence of a physical border like a fence or a wall, but rather on the concept of perception of a border.

As for a method to analyse the sites, it is not possible to quantify the presence of a perimeter. This will therefore be illustrated through images of the office sites (originally from Aerophoto Schiphol 2010).

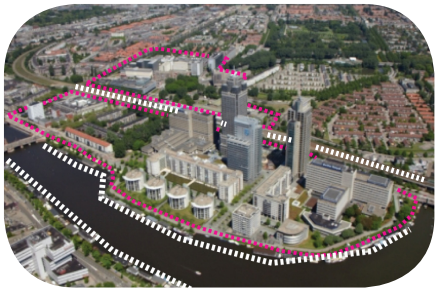


Figure 7.3.1 Amstel: an infrastructural perimeter
Figure 7.3.2 Centrum: no perimeter

The office site Amstel is bordered on one side bordered by the river Amstel and on the other side the train track which passes the train station in the office site.

Centrum is a site of which no perimeter can be perceived. The building types are comparable in and outside the demarcated site.

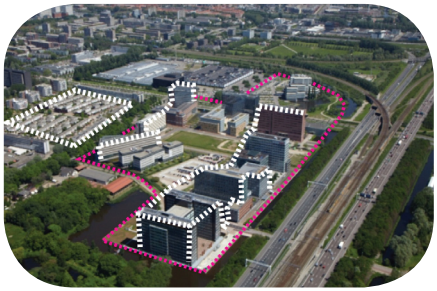
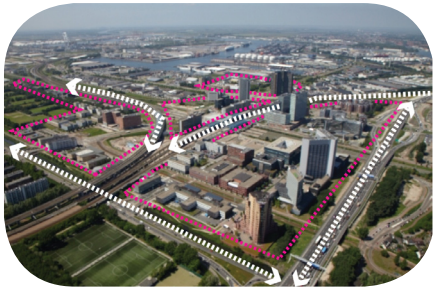


Figure 7.3.3 Lelylaan: an infrastructural perimeter
Figure 7.3.4 Riekerpolder: a perceivable perimeter

Lelylaan is very clearly bordered by the highway A10, parallel to the highway on the west side of the side is the metro track. In the northern side by road (Cornelis Lelylaan) en south by water as can be seen in the image.

Riekerpolder consists of large office buildings which distinguishes the site morphologically from the traditional low rise adjacent housing area.



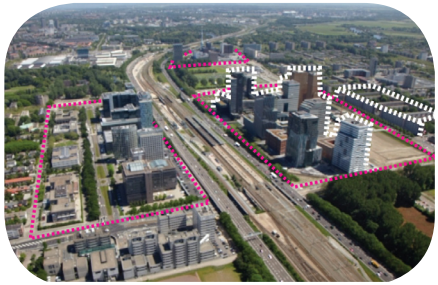


Figure 7.3.5 Teleport: an infrastructural perimeter

Figure 7.3.6 Zuidas: a perceivable perimeter

Teleport is surrounded and crossed by infrastructure; the ringway A10, several train tracks and provincial road (Haarlemmerweg) are present.

The Zuidas is planned on both sides of the ringway A10. It is not bordered by infrastructure, but due to the highrise buildings in contrast to adjacent areas, a perimeter can be perceived.

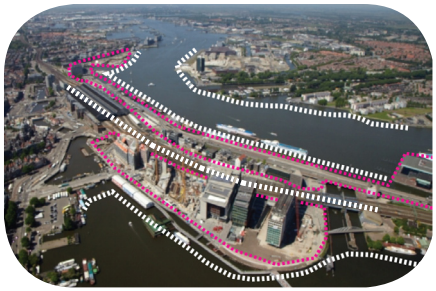


Figure 7.3.7 Zuidelijke IJ-oevers: an infrastructural perimeter

Figure 7.3.8 Zuidflank: no perimeter

The are of Zuidelijke IJ-oevers is as its name states in Dutch bordering the River IJ. Furthermore is the area also enclosed by the train tracks that enable transportation by trains to Central Station.

The Zuidflank is an area with average sized buildings like in surrounding areas. Even though the metro track is crossing the site, still no perimeter is perceivable.

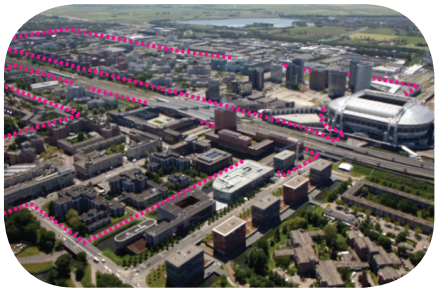


Figure 7.3.9 Zuidoost: no perimeter

The site of Zuidoost is comparable to Zuidflank regarding this parameter, that no perimeter can be perceived around this area.

From the analysis of sites three different values can be distinguished for perimeter options. Either there is an **infrastructural** perimeter, as in the case of Amstel, Lelylaan and Teleport. The sites are enclosed by highway, train track, roads, nature or water.
A second option is a **perceivable** perimeter that does not have a clear physical border, but from the building morphology can be read that a distinctive site is characterized. This is the case for the Zuidas and Riekerpolder that consist of high buildings that contrast with the neighbouring living areas. The last option is that of **no** perimeter, where no differences in urban form of adjacent areas are perceivable.

	PERIMETER
Amstel	infrastructural
Centrum	no
Lelylaan	infrastructural
Riekerpolder	perceivable
Teleport	infrastructural
Zuidas	perceivable
Zuidflank	no
Zuidelijke IJ-oevers	no
Zuidoost	no

Figure 7.3.10 Matrix values for PERIMETER

7.4 Density

To describe the urban form of the office sites in terms of density the Spacemate (Berghauser Pont & Haupt 2009) is used. The indices and Spacemate have been discussed in § 4.4. Very consicely put, the definitions of the Spacemate indices are (Berghauser Pont & Haupt 2004):

Floor Space Index: The FSI expresses the intensity of an area.
Ground Space Index: The GSI expresses the compactness in an area
Open Space Ratio: The OSR expresses the openness and the pressure on the non-built space.
Layers: L expresses the average number of floors in an area.

Figure 7.4.1 Calculation methods indices

The different density indices FSI, GSI, OSR and LAYERS have been measured for all office location and are shown in the next table. In figure 7.4.1 the calculation methods of these indices are depicted. Data from the Municipality of Amsterdam (Dashorst DRO 2010) on area size, built space and gross floor space enabled these calculations.

	FSI	GSI	OSR	LAYERS	BANDWIDTH	MATRIX VALUES
Amstel	1,36	0,28	0,53	4,91	unto 1, 2	high
Centrum	1,06	0,4	0,56	2,64	0,8 to 1, 2	average
Lelylaan	1,15	0,23	0,67	5,06	0,8 to 1, 2	average
Riekerpolder	0,65	0,24	1,17	2,74	from 0,8	low
Teleport	1,05	0,24	0,73	4,41	0,8 to 1, 2	average
Zuidas	1,46	0,27	0,5	5,45	unto 1, 2	high
Zuidflank	0,96	0,33	0,7	2,91	0,8 to 1, 2	average
Zuidelijke IJ-oevers	1,01	0,23	0,76	4,37	0,8 to 1, 2	average
Zuidoost	1,01	0,29	0,7	3,52	0,8 to 1, 2	average

Figure 7.4.2 Density indices and matrix values

The densities outlined above are general, averaged across an area. The average density does not necessarily mean that the whole area has a uniform density. The larger the over which the density is measured, the more heterogeneous it is likely to be. Moreover, as the scale increases, the amount of non-built land (roads, rail, green areas and water) also increases in relative terms, and density subsequently decreases. This was taken into account in the demarcation of areas.

Next, the output of indices for the office sites have been positioned in the Spacemate.

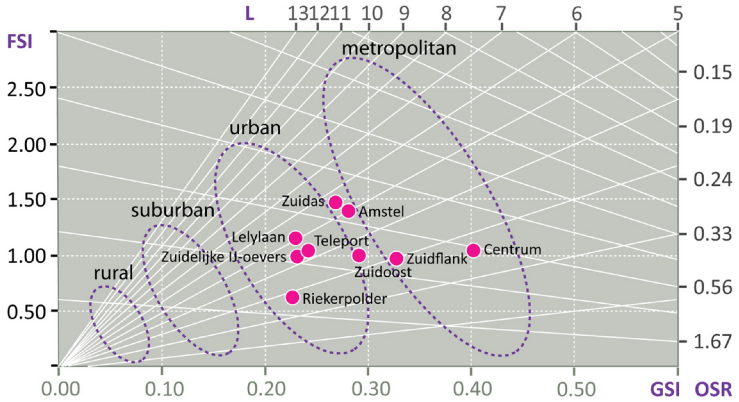


Figure 7.4.3 Office sites in the Spacemate with density zones *Source: Berghauser Pont & Haupt 2009, adaptation author's*

From the Spacemate is read that densities between sites are not significantly different. Some sites have nearly the same density aspects. For instance Zuidas and Amstel are positioned on having a relative high FSI and Layers. The Centrum site appears to be distinct from the other areas and differs mainly on the index of GSI, in this area is relative few open space available. The Spacemate can be read from the bottom left corner towards the right upper corner, from not dense towards dense. Zones of densities are drawn in the Spacemate; most of the office sites have an urban character.
The office areas are actually all not very densely built on all different indicators. Riekerpolder can be considered least dense. Quite remarkable is that Teleport and Zuidelijke IJ-Oevers are nearly the same in the Spacemate, while Teleport would be perceived as much denser than Zuidelijke IJ-oevers.

The values of the FSI (highlighted in table 7.4.2) are the ones used in further calculations and synthesis in this report and are also leading for the matrix values.
An office site can be considered having a **high** density has an FSI higher than 1,2. An FSI between 0,8 and 1,2 indicates an **average** density. A value lower than 0,8 means a **low** density in a certain area.

7.5 Grains

The parameter GRAINS represent the average grain: building size on every office site. This is measured by means of the total gross floor area of a whole building and all buildings in an area.
An office stock database of Bak which dates from 2007 has been adjusted by the department of Real Estate & Housing of TU Delft. This database consist of 1181 office buildings in Amsterdam and contains data per building with address, postal code, year of construction (not for all buildings) and the total floor size for each building. For these a selection of is made of all offices that are located within the demarcated office sites for analysis. The selection consists of 692 offices of which the average gross floor area (GFA) is calculated per office site. The next table represents the average building size (GFA), bandwidths and assigned matrix values.

	GRAINS	MATRIX VALUES	BANDWIDTH
Amstel	14.468	large	from 10.000 m²
Centrum	2.636	small	unto 5.000 m²
Lelylaan	14.485	large	from 10.000 m²
Riekerpolder	15.174	large	from 10.000 m²
Teleport	9.733	medium	5.000 -10.000 m²
Zuidas	21.981	large	from 10.000 m²
Zuidflank	6.558	medium	5.000 -10.000 m²
Zuidelijke IJ-oevers	4.741	small	unto 5.000 m²
Zuidoost	8.896	medium	5.000 -10.000 m²

Figure 7.5.1 Average GRAINS in office sites

The calculation of average sizes shows that those in the Zuidas are remarkably large in relation to the other sites. The largest buildings can be found in this relatively new office site. As expected the site of Centrum accommodates the smallest grain size. Amstel, Lelylaan and Riekerpolder have the same grain size of around 15.000 m².
The bandwidth for a **small** grain size is unto 5.000 m² average gross floor area of the buildings per site. For an **average** size the bandwidth between 5.000 and 10.000 m² is handled. From 10.000 m² and more is considered a **large** grain size.

7.6 Functions

The parameter FUNCTIONS describes the function mix in an office site. This is measured by means of the Mixed Use Index (MXI) of Hoek (2010). This MXI expresses the function mix of areas in percentages of housing, working and amenities. The office sites have been measured on this three aspects as well, as can be seen in the MXI diagram in which the sites are positioned. From the middle of the diagram towards the corners can be read: mixed areas towards monofunctional areas. This is illustrated in the next figure.

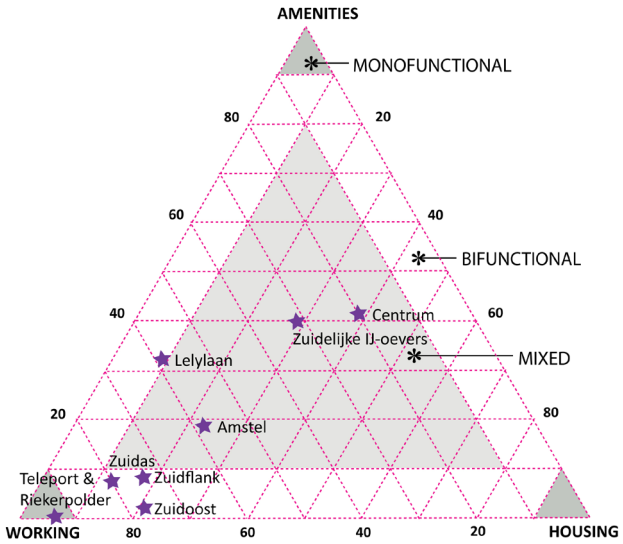


Figure 7.6.1 MXI diagram with office sites in Amsterdam. *Source: Hoek 2010, adaptation author's*

It is for this study relevant to learn what part of 'working' is office related. Therefore the part 'working' is subdivided in 'business and offices', based on data on floor space per function (Dashorst DRO 2010).

From the data can be read that there Riekerpolder and Teleport are nearly monofunctional. Both sites consist for 94% of working, this can also be read from the MXI diagram. The subdivision of working into business and offices does show that Teleport consists of 5 % business functions and Riekerpolder is an only office site. The value '**mainly offices**' has been ascribed to these sites.

There are three other sites with many office buildings, but which also an amount of amenities present: Zuidas, Zuidflank and Zuidoost. Zuidas is often portrayed as mixed area, data shows however that the site is not mixed (yet). The site is still in development. The value '**supported offices**' applies to these types.
Then there are sites which demonstrate a mixture of functions. The sites which have at least three functions equally distributed are named '**mixed area**'.

	HOUSING	AMENITIES	BUSINESS	OFFICES	BANDWIDTH	MATRIX VALUES
Amstel	17%	27%	2%	55%	3 functions equal	mixed area
Centrum	42%	38%	2%	18%	3 functions equal	mixed area
Lelylaan	29%	15%	24%	32%	3 functions equal	mixed area
Riekerpolder	0%	6%	0%	94%	Offices unto 80%	mainly offices
Teleport	0%	6%	5%	89%	Offices unto 80%	mainly offices
Zuidas	7%	12%	0%	80%	Offices 60% to 80%	supported offices
Zuidflank	8%	18%	7%	67%	Offices 60% to 80%	supported offices
Zuidelijke IJ-oevers	40%	28%	1%	31%	3 functions equal	mixed area
Zuidoost	2%	21%	3%	74%	Offices 60% to 80%	supported office

Figure 7.6.2 FUNCTIONS in office sites

7.7 Users

The corporations that accommodate office buildings are considered the USERS. This parameter is expressed through the User Index: the average amount of companies per hectare. A data set was used from the Chamber of Commerce (KvK) obtained from Dashorst DRO (2010).
This data set consist of all registered companies in the demarcated office sites and categorized on amount of employees. The information on number of employees is acquired annually by KvK through a questionnaire, which generates a response of 60% (DRO 2010). Consequently some of the data on number of employees may be outdated. The registration of number of employees does not imply that all employees work on the address of registration. This data does however give an impression of company size.

A distinction is made between companies with 50 employees or less and those with more than 50 employees. This threshold is used, because companies with more than 50 employees usually concern office related work. For both subgroups the amount of companies per

sub categorization of amount of employees is listed and the average number of companies per ha (user index) is calculated.

	1	2 to 10	11 to 20	21 - 50	Total <50	SIZE in ha	USER Index
Amstel	109	46	22	25	**202**	31	**6,52**
Centrum	7.687	5.474	569	324	**14054**	576	**24,4**
Lelylaan	199	211	18	11	**439**	32	**13,72**
Riekerpolder	6	17	6	4	**33**	23	**1,43**
Teleport	112	222	47	51	**432**	91	**4,75**
Zuidas	213	253	47	48	**561**	54	**10,39**
Zuidflank	86	21	4	8	**119**	23	**5,17**
Zuidelijke IJ-oevers	278	178	30	28	**514**	58	**8,86**
Zuidoost	217	461	70	76	**824**	156	**5,28**

Figure 7.7.1 User density for companies with unto 50 employees

	51 - 100	101 - 250	251 - 500	501 - 1000	> 1001	TOTAL 50+	SIZE in ha	USER Index	BANDWIDTH	MATRIX VALUES
Amstel	9	3	2	4	2	**20**	31	**0,65**	0,5 to 0,7	average
Centrum	96	69	24	7	2	**198**	576	**0,34**	unto 0,5	few
Lelylaan	6	3	1	3	0	**13**	32	**0,41**	unto 0,5	few
Riekerpolder	2	3	5	2	1	**13**	23	**0,57**	0,5 to 0,7	average
Teleport	34	23	7	6	3	**73**	91	**0,8**	from 0,7	many
Zuidas	16	7	9	1	2	**35**	54	**0,65**	0,5 to 0,7	average
Zuidflank	7	2	3	0	1	**13**	23	**0,57**	0,5 to 0,7	average
Zuidelijke IJ-oevers	9	9	4	0	0	**22**	58	**0,38**	from 0,5	few
Zuidoost	43	25	14	10	7	**99**	156	**0,63**	0,5 to 0,7	average

Figure 7.7.2 User density for companies with more than 50 employees

From the two tables we can read that there are large differences on which sizes of companies are accommodated in the areas. For instance the Centrum site, which has by far the highest user index for companies unto 50 employees. While with the larger companies the user index is lowest of all sites. In Centrum are many small companies and also many registrations for sole proprietorships.

Teleport shows in the second table to accommodate relatively the most large companies per hectare. The user index for Riekerpolder tells us that there are very few small

companies located in the area and that there are 13 large companies. It seems as if the user index is related to the grain size of buildings.

For this study the USER index of companies with more than 50 is most relevant and therefore used for further calculations and matrix values.
Values unto 0,5 indicate there are **few** companies per hectare. An **average** number of companies is specified between the values 0,5 and 0,7. **Many** companies are present per hectare when the value exceeds 0,7.

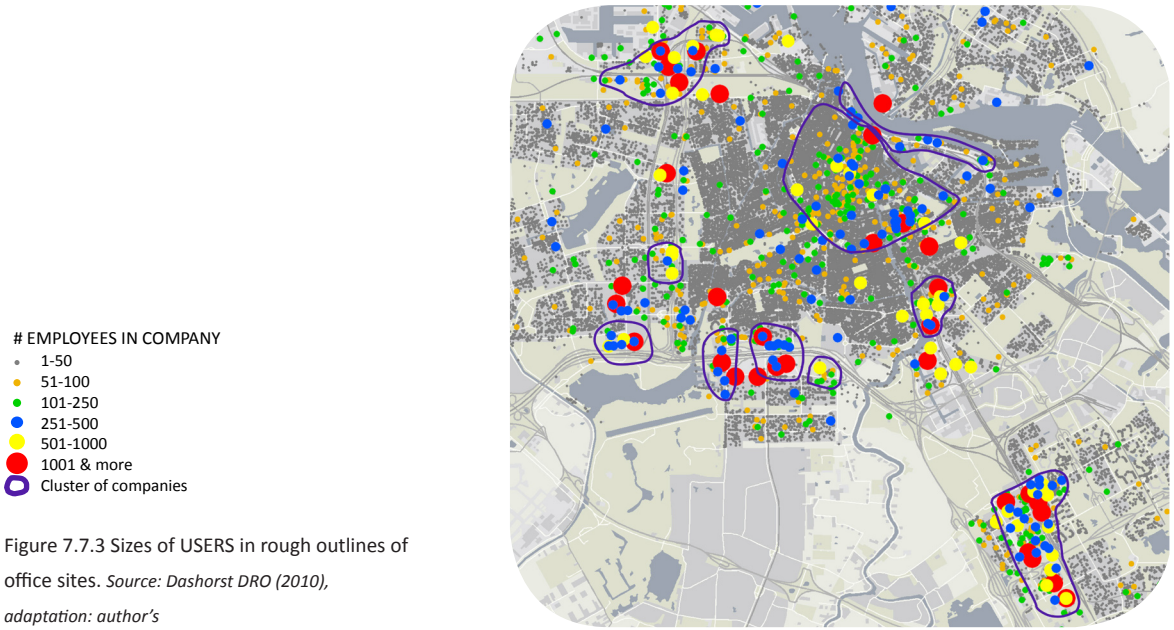


Figure 7.7.3 Sizes of USERS in rough outlines of office sites. *Source: Dashorst DRO (2010), adaptation: author's*

4 PART
Synthesis of Parameters

In this forth part of the study synthesis of parameter values is performed to define classification methods which can enable type construction.

In chapter 8, approaches to classification, a mathematical, quantitative and visual approach are described. Through these approaches combinations of abstract parameter values of office sites are identified. Several combinations are shown in a matrix, radar diagram and through illustrations.

Chapter 9, type construction, further analyses the combinations by means of the matrix from the mathematical approach. In addition is determined which parameters are dominant in combinations as to define a set of parameters for type construction. Last, types of office sites, amongst the cases in Amsterdam, are defined an illustrated.

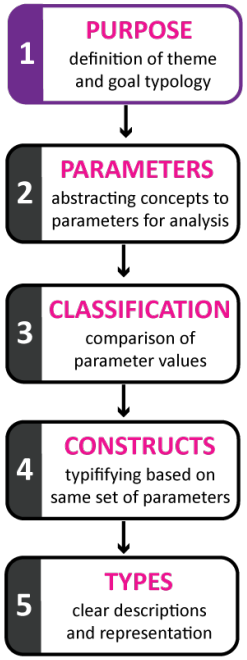


Figure 8.1 Approach to developing typologies

8. APPROACHES TO CLASSIFICATION

The aim of this study is to explore whether types of office sites can be derived from an analysis of office site based on spatial characteristics. We arrive at the third step, 'Classification', of the approach to developing a typology, shown in figure 8.1.

3 **CLASSIFICATION** SCHEME. As classification is the condition for combinations; it is therefore essential to develop a classification method for parameter aspects.

In the previous chapter the output of the spatial parameters was shown for all parameters which allowed for office sites to be compared. That comparison will be continued by means of the abstract matrix values. Three classification methods are applied: a mathematical approach, quantitative approach and visual approach. The aim is to explore possible types of office sites through these three approaches.

8.1 Mathematical approach

The mathematical approach to classification handles the matrix values that have been defined in the previous chapter. The quantitative output of parameters has been reduced to three options per parameter. By means of this abstraction of quantitative indicators a catalogue of combinations is created. This way the output of analysis remains comprehensive. This is not only valuable for the case studies in Amsterdam, but can also be implemented in other typology studies.

The values of the matrix are relative terms. For instance a well connected area is related to the other areas that are less connected. With a larger data set the bandwidths may be redefined. In this mathematical approach all seven parameters are taken into account. The next matrix displays an overview of all values of parameters.

	POSITION	NODES	PERIMETER	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel	good	central	infrastructural	high	large	mixed area	average
Centrum	poor	central	no	average	small	mixed area	few
Lelylaan	good	ring	infrastructural	average	large	mixed area	few
Riekerpolder	poor	ring	perceivable	low	large	mainly offices	average
Teleport	poor	ring	infrastructural	average	large	mainly offices	many
Zuidas	good	ring	perceivable	high	large	supported offices	average
Zuidflank	average	ring	no	average	medium	supported offices	average
Zuidelijke IJ-oevers	average	central	infrastructural	average	small	mixed area	few
Zuidoost	poor	peripheral	no	average	medium	supported offices	average

Figure 8.1.2 Abstract parameter values in matrix

The matrix shows a classification of spatial characteristics of office sites. Next, a combination of parameter values is listed horizontally per office site. Combinations between sites with at least four corresponding parameters are considered relevant to this study. As these may imply types.

	POSITION	NODES	PERIMETER	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel	good	central	infrastructural	high	large	mixed area	average
Centrum	poor	central	no	average	small	mixed area	few
Lelylaan	good	ring	infrastructural	average	large	mixed area	few
Riekerpolder	poor	ring	perceivable	low	large	mainly offices	average
Teleport	poor	ring	infrastructural	average	large	mainly offices	many
Zuidas	good	ring	perceivable	high	large	supported offices	average
Zuidflank	average	ring	no	average	medium	supported offices	average
Zuidelijke IJ-oevers	average	central	infrastructural	average	small	mixed area	few
Zuidoost	poor	peripheral	no	average	medium	supported offices	average

Figure 8.1.3 Four matches of office sites

In figure 8.1.3 by means of colors five combinations between sites are shown. As can be read from that matrix is that four combinations are identified based on at least four corresponding values of parameters. There are no combinations of seven or six corresponding parameters. The highest number of corresponding parameter values is five. This can be seen in the matrix in the colors orange and green.

For instance, the sites Amstel and Lelylaan, show (in purple) to have the same values for (good) NODES, (infrastructural) PERIMETER, (large) GRAINS & (mixed area) FUNCTIONS. The office site appears to also have four corresponding values with another site: Zuidas. The red boxes in the matrix indicate the combinations. The parameter values for GRAINS and NODES are also corresponding with Lelylaan.

The classification scheme also shows (in blue) that Riekerpolder and Teleport have (poor) NODES, (ring) POSITION and (large) GRAINS and (mainly offices) FUNCTIONS in common. A combination of four out of seven parameters. In the same way the other two combinations: between Centrum & Zuidelijke IJ-oevers and Zuidflank & Zuidoost can be described.
To conclude, five combinations of office sites appear to have spatial aspects in common based on the matrix values assigned to quantitative calculations:

- Amstel & Lelylaan
- Amstel & Zuidas
- Centrum & Zuidelijke IJ-oevers
- Teleport & Riekerpolder
- Zuidoost & Zuidflank

8.2 Qantitative Approach

The quantitative approach offers a second option for classification, based on the quantitative output of parameters. The output of calculations have been summarized in the next table.

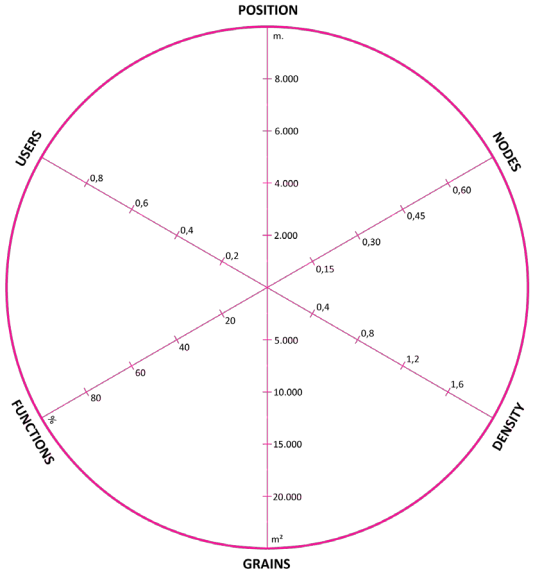
	POSITION	NODES	DENSITY	GRAINS	FUNCTIONS	USERS
	distance to Dam in m.	Average PT connections per ha	FSI: Total GFA / area size	average GFA m² per building	% offices of all functions	# of firms with 50+ empl. per ha
Amstel	3500	0,65	1,36	14.468	55%	0,65
Centrum	1000	0,2	1,06	2.636	18%	0,34
Lelylaan	4300	0,59	1,15	14.485	32%	0,41
Riekerpolder	5500	0,17	0,65	15.174	94%	0,57
Teleport	4100	0,27	1,05	9.733	89%	0,8
Zuidas	4400	0,54	1,46	21.981	80%	0,65
Zuidflank	4800	0,48	0,96	6.558	67%	0,57
Zuidelijke IJ-oevers	2000	0,41	1,01	4.741	31%	0,38
Zuidoost	8200	0,18	1,01	8.896	74%	0,63

Figure 8.2.1 Quantitative output of parameters.

The aim is to put the quantitative parameters out in a clear diagram in which the different office sites will be projected through their parameter values. The parameter PERIMETER was not able to quantify and will therefore be left out of this quantitative classification scheme. A radar chart with six axes is used for this matter; a parameter is plotted on each axis (figure 8.2.1).

The bandwidths of the quantitative values of the different parameters have been drawn in planes. Per parameter three bandwidths (table 8.2.2) were defined which are represented by planes from three shades of gray. The planes are created by connecting the bandwidth values of the different parameter axes. The inner dark grey represents the lowest bandwidth, since the middle point of the chart is the starting point of all axes.

	BANDWIDTHS	MATRIX VALUES
1. POSITION	unto 4000 m	central
	4000 to 6000 m	ring
	from 4000 m	peripheral
2. PERIMETER		perceivable
		infrastructural
		no
3. NODES	unto 0,3	poor
	3 to 5	average
	from 5	good
4. DENSITY	unto 0,8	low
	0,8 to 1,2	average
	from 1,2	high
5. GRAIN	unto 5.000 m²	small
	5.000 to 10.000 m²	medium
	from 10.000 m²	large
6. FUNCTIONS	offices unto 80%	mainly offices
	Offices 60% - 80%	supported offices
	3 functions equal	mixed area
7. USERS	unto 0,5	few
	0,5 to 0,7	average
	from 0,7	many



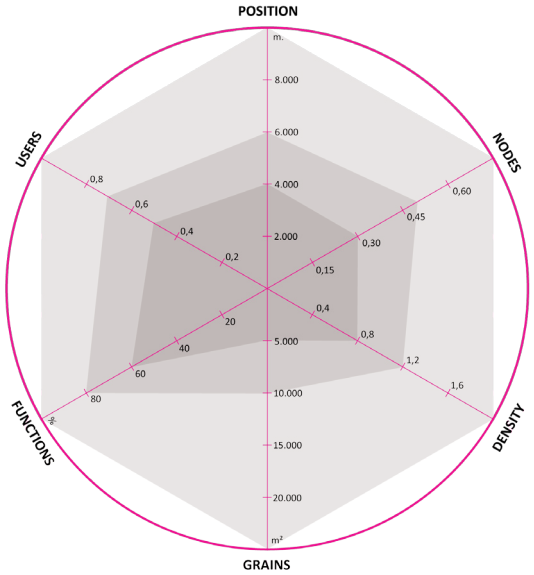


Figure 8.2.2 Bandwidths and matrix values of parameters

Figure 8.2.3 Radar chart with six parameters

Figure 8.2.4 Radar chart with bandwidths parameters

Next, all office sites are positioned in the chart, based on their quantitative values. The values are connected by lines.

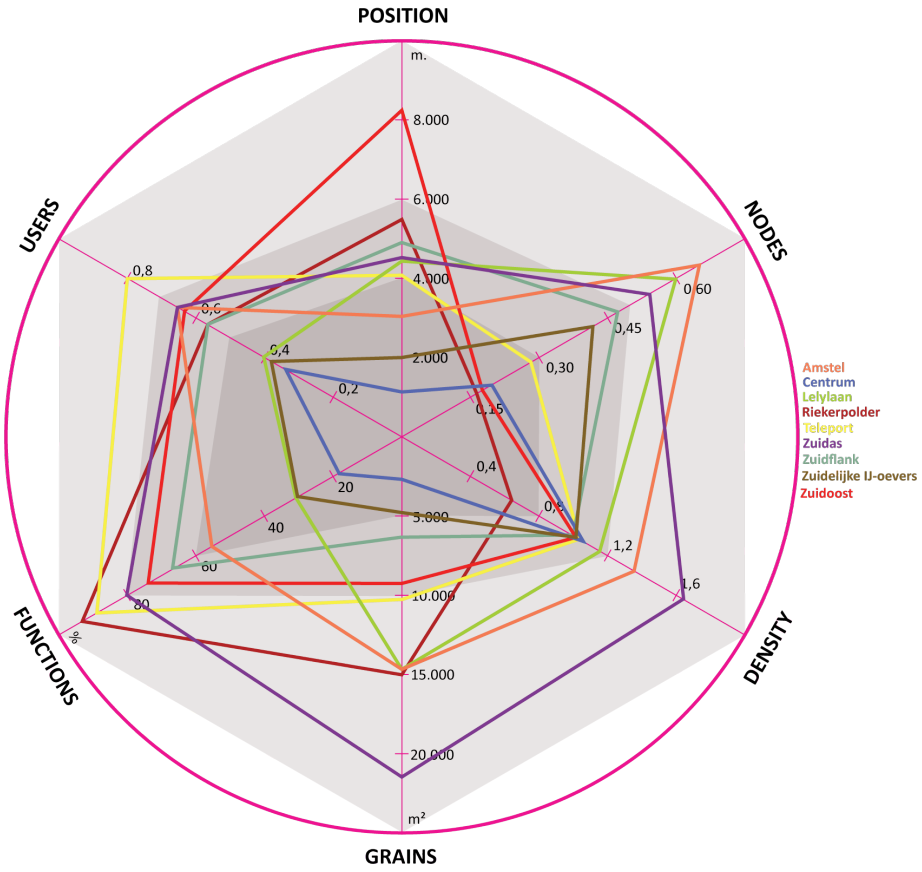
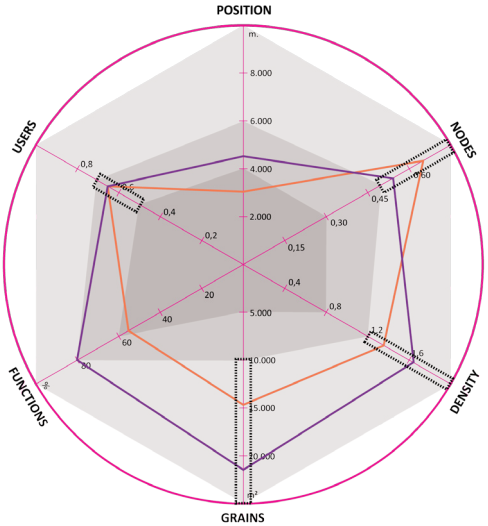


Figure 8.2.5 Nine office sites positioned in radar chart.

This chart enables the comparison of office sites and the search for combinations. The colored drawn lines represent the sites. If a closer look is taken at the chart there can be explored which lines have values or bandwidths of parameters in common. The next figures represent the most obvious similarities between sites. As in the mathematical approach there is looked for combinations with at least four corresponding parameter values.



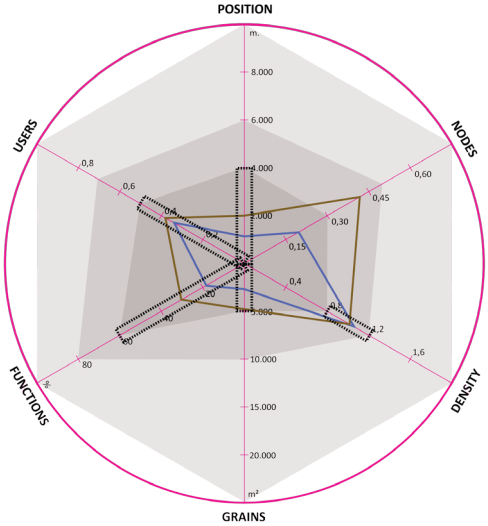
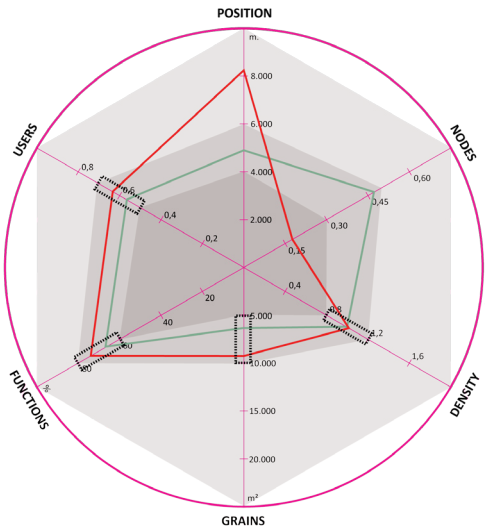


Figure 8.2.6 Amstel and Zuidas in radar chart (left)
Figure 8.2.7 Centrum & Zuidelijke IJ-oevers in radar chart (right)

The office sites Amstel and Zuidas have for four parameters the same bandwidth in common. The black rectangles represent a complete bandwidth of a parameter in which the locations are found. Three out of the four corresponding parameters are in the highest bandwidths: Large grains, high density, many users and the sites are well connected.

Centrum and Zuidelijke IJ-oevers have five out of six corresponding values (figure 8.2.7). In contrast with Amstel & Zuidas these sites are positioned in the smallest bandwidths. These sites have a central position, few users, mixed functions and small grains.



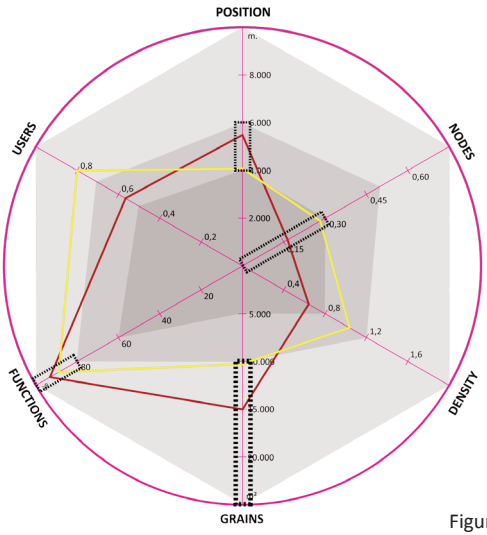


Figure 8.2.8 Zuidflank & Zuidoost in radar chart (left)
Figure 8.2.9 Riekerpolder & Teleport in radar chart (right)

The sites of Zuidflank & Zuidoost are sites that have average outcomes for all corresponding parameters. This can be read in figure 8.2.8. The areas have average grains, average density, an average number of users and large amount of offices in the area that is supported by amenities.

Riekerpolder & Teleport have large grains, mainly offices, poor connectivity and a ring position in common.

Through this quantitative approach four combinations between distinct office sites, with at least four corresponding values, have been revealed. A radar chart is a valuable means to visualise the spatial aspects of the office sites and show their relations in one image.

- Amstel with Zuidas
- Centrum with Zuidelijke IJ-oevers
- Teleport with Riekerpolder
- Zuidoost with Zuidflank

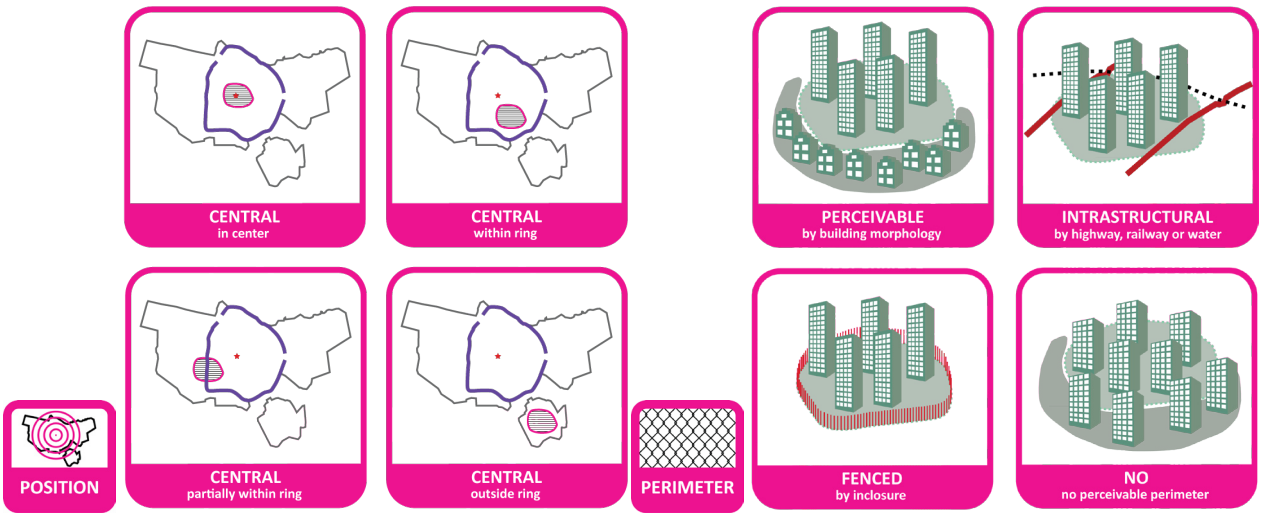
8.3 Visual Approach

A visual approach of parameters offers a third approach to classification. The calculations of parameters give an impression of how a site is organized, but do not express the spatial arrangement of certain spatial aspects within office sites. For instance FUNCTIONS; if an area is mixed it does not imply that all mixed areas are arranged the same. Within different spatial options of mixing some main values have been distinguished and illustrated. For FUNCTIONS this is pictured in figure 8.3.6.

The spatial distribution of the different values of each parameters are represented graphically by the following images. Every parameters shows four spatial values.

Figure 8.3.1 Visual values of POSITION

Figure 8.3.2 Visual values of PERIMETER



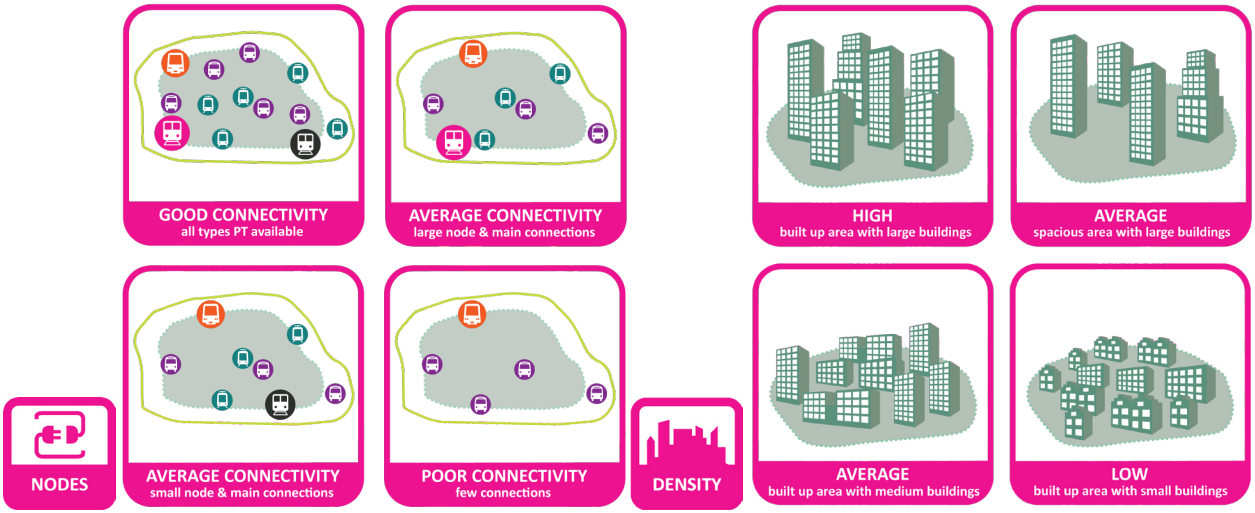


Figure 8.3.3 Visual values of NODES

Figure 8.3.4 Visual values of DENSITY

Figure 8.3.5 Visual values of GRAINS

Figure 8.3.6 Visual values of FUNCTIONS

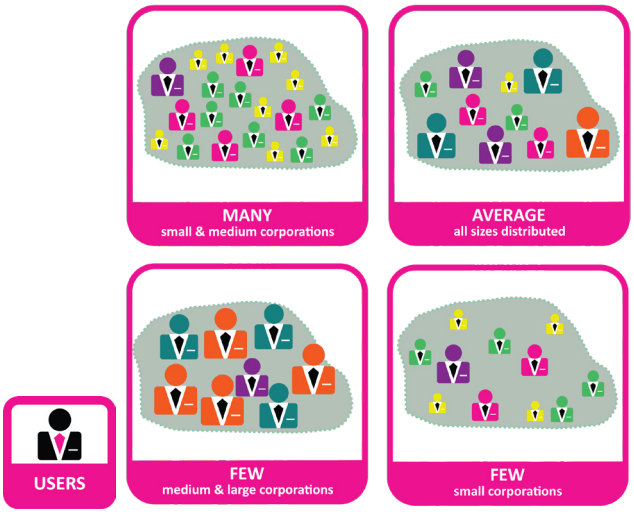


Figure 8.3.7 Visual values of USERS

A classification scheme is set up with the spatial values of parameter for each office site. This classification method allows for combination (figure 8.3.8 & 8.3.9).

The combinations between office sites found in previous two approaches can still be traced back here. Amstel and Zuidas remain corresponding for the parameters NODES, DENSITY, GRAINS and USERS. The sites Centrum & Zuidelijke IJ-oevers have in common the spatial aspects of POSITION, DENSITY, GRAINS, FUNCTIONS and USERS. Amstel also has parameters in common with Lelylaan: NODES, PERIMETER, GRAINS and USERS. Teleport & Riekerpolder also have four parameters in common: NODES, POSITION, GRAINS and FUNCTIONS. The last match that appeared in the previous paragraphs was between the sites of Zuidflank and Zuidas. These are still a match based on four parameters: PERIMETER, DENSITY, GRAINS, FUNCTIONS and USERS.

This spatial approach identified the same five combinations of sites as the mathematical approach, based on at least four visual parameters, illustrated on the next pages.

- Amstel with Zuidas
- Amstel with Lelylaan
- Centrum with Zuidelijke IJ-oevers
- Teleport with Riekerpolder
- Zuidoost with Zuidflank

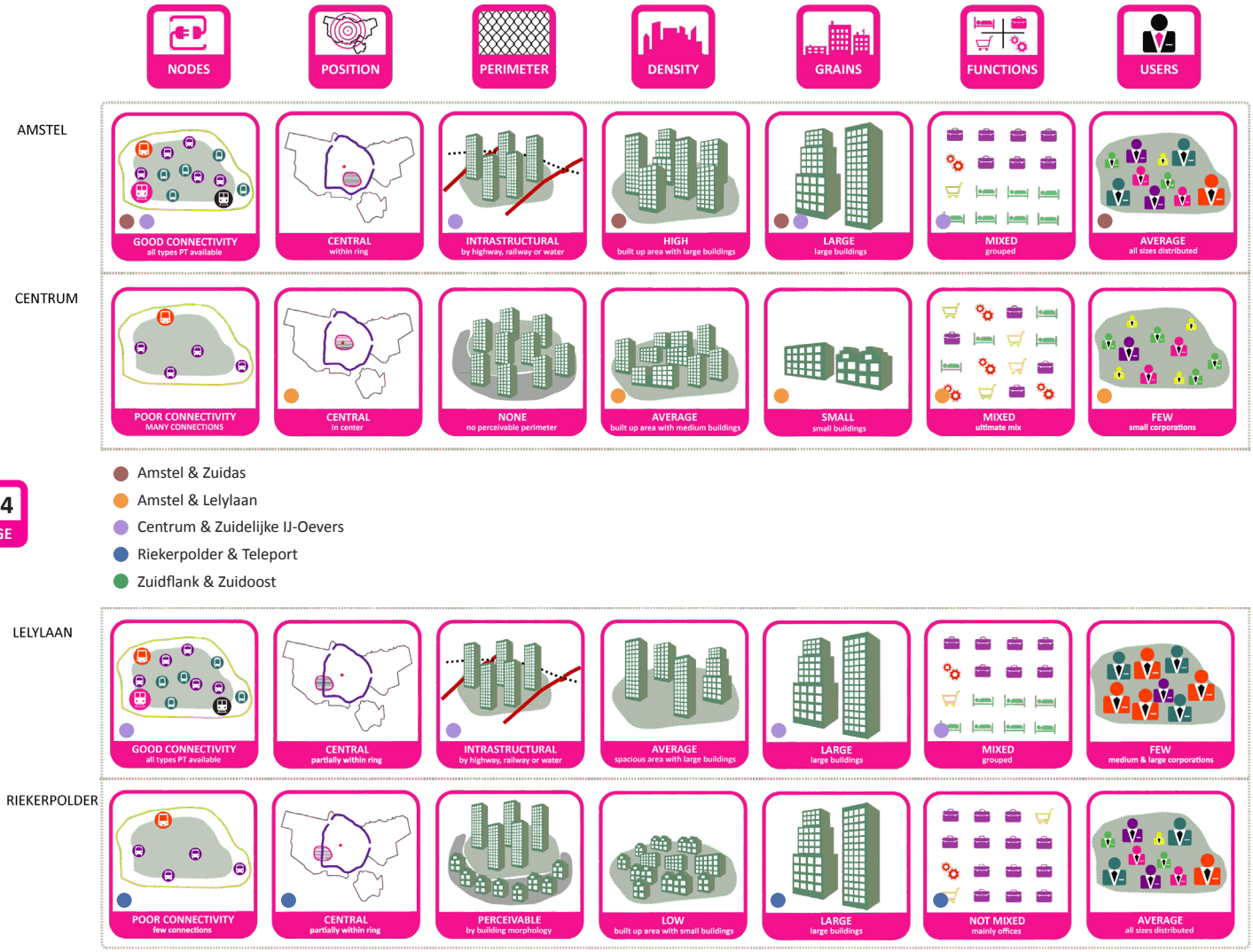


Figure 8.3.8 Visual values for Amstel, Centrum, Lelylaan and Riekerpolder

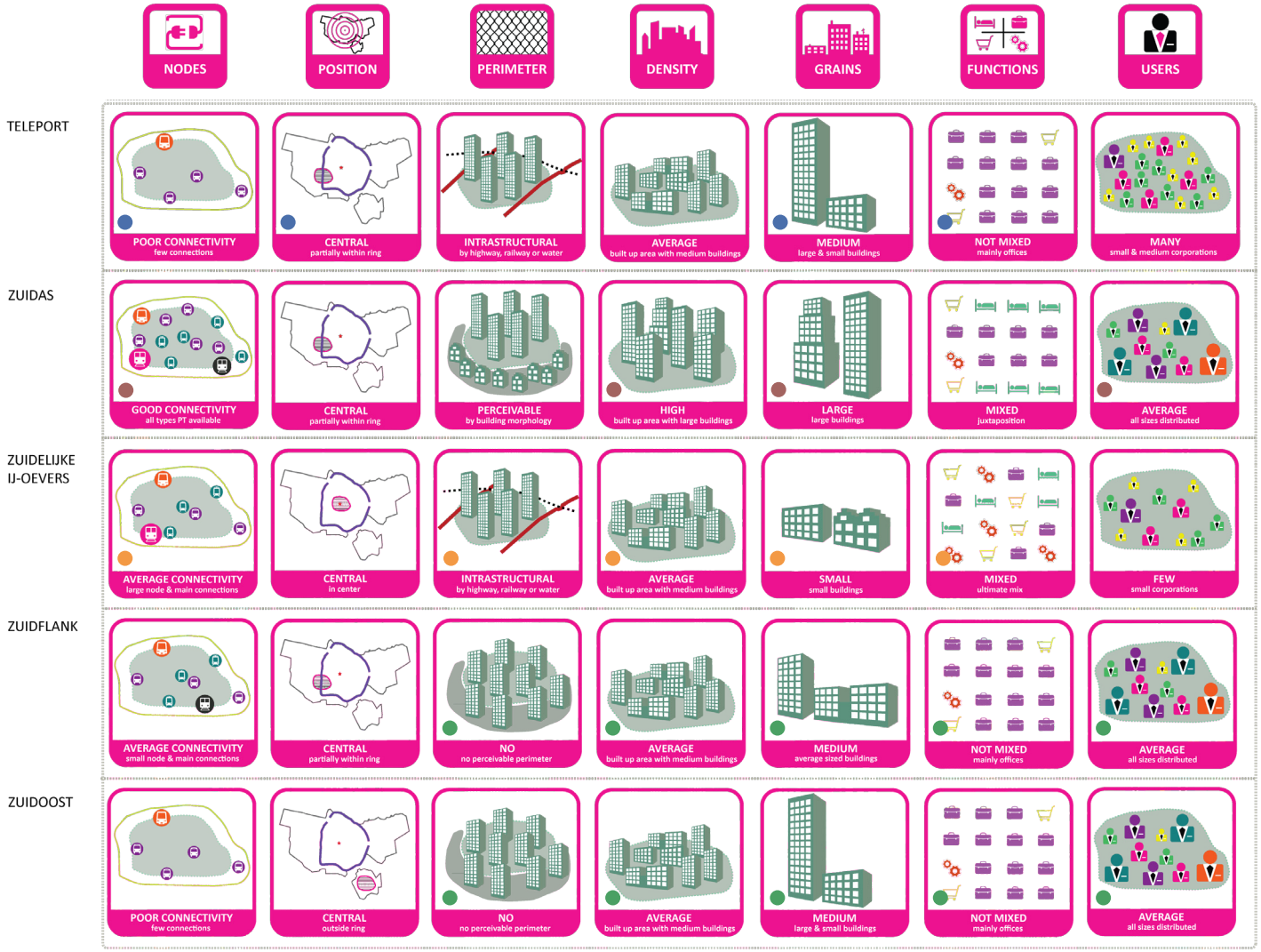


Figure 8.3.9 Visual values for Teleport, Zuidas, Zuidelijke IJ-oevers, Zuidflank en Zuidoost

8.4 Conclusion

The mathematical approach handles three abstract values per parameter and offers a classification of these values. Within the matrix different combinations of parameters can be explored between office sites and be distinguished. This approach is manageable when studying a small number of case studies. When considering more case studies the overview is lost fast.

A limitation of the quantitative approach and its representation in a radar chart is that it is not possible to incorporate parameters which are not able to be expressed quantitatively. In this study it was not able to quantify the parameter PERIMETER. This approach however, by means of the radar chart, does offer a clear overview of quantitative parameters and enables a comparison in one diagram. This approach could prove to be a clear approach to type construction when considering more cases Studies.

The visual approach illustrates the various spatial distributions of parameters that are possible. In this approach four values per parameters are distinguished, this theoretically causes more possible combinations. Due to the variety of possible combinations office sites that showed a combinations in the quantitative and mathematical approach could now be different. The spatial values allow to go more into detail regarding office sites, which makes it hard to typify office sites by this approach when studying only nine case studies. This approach is certainly useful when evaluating more cases.

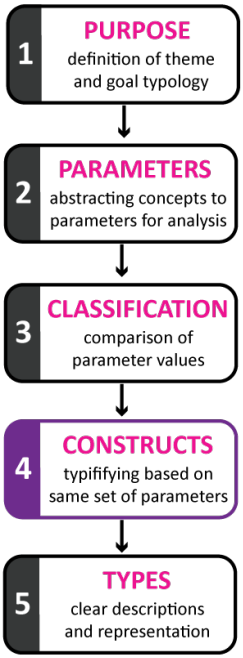


Figure 9.1 Approach to developing typologies

Figure 9.2 Matrix with five combinations of sites based on four parameters.

9. TYPE CONSTRUCTION

9.1 Type Construction Principles

In the previous chapter three approaches to classification were described: quantitative, mathematical and graphical. The mathematical approach is most suitable for comparison when working with a small number of case studies.
The next step is to determine which matches between office sites could be recognized as types. Reoccurrence of structures may indicate the presence of a type (Leupen 2002:108). Furthermore literature on typologies has pointed out the necessity of the description of types using the same dimensions (Doty & Glick 1994). This relates to the fourth step in the approach to developing typologies (figure 9.1).

4 CONSISTENT **CONSTRUCTS.** It is important to identify the decisive parameters to enable creating constructs based on the same parameters. In order that types can be distinguished on the same set of spatial characteristics.

In this study seven spatial parameters have been defined and operationalised as to create a classification for type construction. The classification by matrix (figure 9.2) helped to highlight five different combinations, based on a minimum of four corresponding matrix values. However from the matrix can be read that not all highlighted combinations are based on a similar set of spatial parameters. To reach a consistent set of decisive parameters for type identification, the contribution of each of the seven parameters to the distinction of the sites will be evaluated through the combinations from the matrix.

	POSITION	NODES	PERIMETER	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel	good	central	infrastructural	high	large	mixed area	average
Centrum	poor	central	no	average	small	mixed area	few
Lelylaan	good	ring	infrastructural	average	large	mixed area	few
Riekerpolder	poor	ring	perceivable	low	large	mainly offices	average
Teleport	poor	ring	infrastructural	average	large	mainly offices	many
Zuidas	good	ring	perceivable	high	large	supported offices	average
Zuidflank	average	ring	no	average	medium	supported offices	average
Zuidelijke IJ-oevers	average	central	infrastructural	average	small	mixed area	few
Zuidoost	poor	peripheral	no	average	medium	supported offices	average

9.2 Decisive Parameters

The matrix with seven parameters allows to explore which parameters are most dominant in combinations between office sites. The number of times, a parameter is used in a combination, is summed under each parameter column. Four parameters appear to be more important than others. The parameters DENSITY and USERS are marked six times as corresponding parameters between office sites. FUNCTIONS is for seven office sites part of combination and GRAINS is used in all combinations between the nine office sites. Does this imply that GRAINS is the most important parameter?

	POSITION	NODES	PERIMETER	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel	good	central	infrastructural	high	large	mixed area	average
Centrum	poor	central	no	average	small	mixed area	few
Lelylaan	good	ring	infrastructural	average	large	mixed area	few
Riekerpolder	poor	ring	perceivable	low	large	mainly offices	average
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Zuidelijke IJ-oevers	average	central	infrastructural	average	small	mixed area	few
Zuidoost	poor	peripheral	no	average	medium	supported offices	average
	5	4	4	6	9	8	6

Figure 9.3 Seven spatial parameters with number of use in combinations

Next, the combinations based on only these four parameters are further studied; they are highlighted in the next figure.

	POSITION	NODES	PERIMETER	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel	good	central	infrastructural	high	large	mixed area	average
Centrum	poor	central	no	average	small	mixed functions	few
Lelylaan	good	ring	infrastructural	average	large	mixed functions	few
Riekerpolder	poor	ring	perceivable	low	large	mainly offices	average
Teleport	poor	ring	infrastructural	average	large	mainly offices	many
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Zuidflank	average	ring	no	average	medium	supported offices	average
Zuidelijke IJ-oevers	average	central	infrastructural	average	small	mixed area	few
Zuidoost	poor	peripheral	no	average	medium	supported offices	average
	5	4	4	6	9	8	6

Figure 9.4 Four dominant parameters

Centrum and Zuidelijke IJ-oevers (orange boxes) have similar values on the selected parameters and can thus be defined as a type. The additional corresponding central POSITION even reinforces the type. A definition of identified types is given in the next paragraph.

Zuidflank and Zuidoost (green boxes) have the same values for the four parameters. Similar densities, grain sizes, function mixing and amount of users in the area makes that these can be defined as type as well.

Now that the focus is on four parameters, another combination of three corresponding parameters is revealed. Centrum has three corresponding parameters (in pink) with Lelylaan: average DENSITY, mixed area and few USERS. However these two sites cannot be perceived as the same and practitioners nor local governments will consider these two a type. The grain size of buildings is different and therefore GRAINS is considered a decisive parameter.

The office site Amstel has corresponding parameter values for GRAINS, DENSITY and USERS with Zuidas and has large GRAINS and mixed FUNCTIONS with Lelylaan in common. Amstel and Zuidas with three out of four parameters represent a third type.

Lelylaan can be considered an in between type, as it is more comparable with Amstel and Zuidas if density increases. This is actually what is planned for this area (Stadsdeel Niew West 2010), where currently a few uncultivated parcels are available for new projects. The current density of Lelylaan is average with an FSI of 1,15 and will sure increase over 1,2 (lower limit of bandwidth to express high density) after new constructions.

The aspect of time should be considered as well when drawing conclusions on types of office sites. The calculations are performed with current data while developments in some office sites are still taking place. As described before this is the case with Lelylaan which can be considered an in-between-type.

Zuidas is a comparable case study regarding the function mix of the area. The data of the functions in Zuidas now expresses mix of housing 7% / amenities 12% / business 0% / offices 80%. Such function mixed area has earlier in the report (§ 5.7) been defined as ‘supported office site’. This is in contrast to what the policy makers of the Zuidas have planned for development. The Zuidas is planned as mixed area of several functions like dwellings and amenities besides offices. With this fact in mind Zuidas, Amstel and Lelylaan

could be considered even more alike and could be regarded as a type. Since a high density, large grains and a mixed area will be the mutual characteristics.

In the matrix the blue boxes represent the corresponding parameters between Riekerpolder and Teleport. Large grains and mainly offices (as part of the four selected parameters) are characteristics of both these types. These sites are also poorly connected and have a ring connection. The value mainly offices appeared to be quite exceptional for office sites; it means that at least 90% of total built floor space consists of offices. The parameter FUNCTIONS is therefore besides GRAINS an important parameter to distinguish on. Since Riekerpolder & Teleport have this aspect in common and have equal grain sizes; these two will be defined as type as well.

From the combinations based on the four selected important parameters GRAINS and FUNCTIONS appear to be most decisive in type construction founded on the nine selected cases in Amsterdam. The types are a construction, something that is defined based on the spatial parameters and a further selection of these. To make the conclusions on decisive parameters and type construction statistically sound more cases are needed. As the importance of certain parameters in relation to others can then be further analysed.

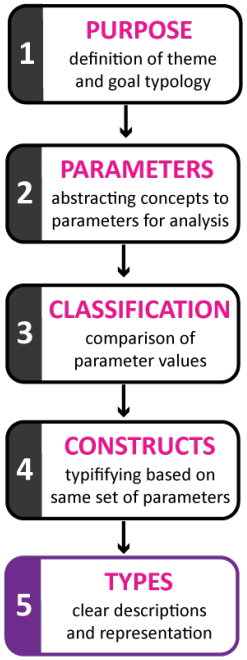


Figure 9.5 Approach to developing typologies

9.3 Definitions of Types

The last step (figure 9.5) in the development of typologies is:

5 DEFINITION AND REPRESENTATION OF **TYPES** Clear descriptions and illustrations of the distinguished types enable recognition of types and support a clear language regarding the theme.

The types have corresponding constructs on the same set of parameters: DENSITY, GRAINS, FUNCTIONS and USERS. Of these, GRAINS and FUNCTIONS appeared to be more decisive than other parameters. The identified types will be defined based on the four parameters and illustrated next to clarify the distinct types.

	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel	high	large	mixed area	average
Centrum	average	small	mixed area	few
Lelylaan	average	large	mixed area	few
Riekerpolder	low	large	mainly offices	average
Teleport	average	large	mainly offices	many
Zuidas	high	large	supported offices	average
Zuidflank	average	medium	supported offices	average
Zuidelijke IJ-oevers	average	small	mixed area	few
Zuidoost	average	medium	supported offices	average

Figure 9.6 Constructs of types

FOUR TYPES OF OFFICE SITES

TYPE 1 Form the characteristics of Amstel, Zuidas & lelylaan the next type is defined:

METROPOLITAN Office site with a high density, large buildings and mixed functions and average amount of office users.

TYPE 2 Centrum & Zuidelijke IJ-oevers are similar:

CENTRAL URBAN Office site with an average density, small buildings and few office users.

TYPE 3 Zuidflank & Zuidoost have the next definition of office site in common:

SUPPORTED OFFICES Office site with an average density, medium sized buildings, a fair amount of offices supported by amenities and an average number of office users.

TYPE 4 Riekerpolder & Teleport can be considered:

MONOFUNCTIONAL Office site with large buildings and mainly offices.

Figure 9.7 Four office site types

9.4 Other Possible Types

From this analysis the defined four types seem to be evident. However because this study used a limited number (nine) of case studies it is not possible to generalize these for other cities. The found types are probably not the only ones apparent in the built environment. Studies of cases in other cities could deliver even distinct types. For instance in the Netherlands the office market of Amsterdam is different from that of other large cities, like Den Haag or Rotterdam. Amsterdam has proven to be an attractive location for the accommodation of headquarters of large corporations. Furthermore these types have been defined from urban office site cases only. There may be office sites in the periphery.

The main construct of the defined types were based on the four parameters DENSITY, GRAINS, FUNCTIONS and USERS. In type construction GRAINS and FUNCTIONS appeared decisive in all combinations. A quick examination of combinations based on these two parameter can already point out possible other types. Theoretically there are 32 = 9 combinations possible, based on three matrix values for each of two parameters. In the next table the theoretical combinations are shown.

	GRAINS	FUNCTIONS	TYPES
1	small	mixed area	**Central Urban**
2	small	supported offices	
3	small	mainly offices	
4	average	mixed area	
5	average	supported offices	**Supported offices**
6	average	mainly offices	
7	large	mixed area	**Metropolitan**
8	large	supported offices	
9	large	mainly offices	**Monofunctional**

Figure 9.8 Possible constructs for types

Four of the nine combinations have been identified as existing types in Amsterdam. A short reflection is given on the possibility that the other combinations from the table represent real types.

2. Small grains (<5.000 m2) are expected to be found either in historical centers or in the periphery. In extensions of cities, usually large grains were build. Small grains & many offices (between 60% - 80%) are not likely to appear in city centers which are usually mixed areas. So in peripheral areas these may be identified.

3. An small grain size in combination with at least 80% offices is also not likely to exist within the city. This type could rather be found in the periphery or bordering cities.
4. Areas with average sized buildings (5.000 to 10.000 m2) are (in the Netherlands) usually build in post-war developments. These areas formed an extension to the historical areas. Offices build in that period got relatively larger building sizes (Hoek 2007). These office sites could be mixed areas in cities.

6. Areas with average grains are also likely to accommodate mainly offices (>80%). Like the Monofunctional type areas may exist with an only-office purpose.

8. Large grain office sizes is a phenomenon from the last two decades. The service sector has grown which is reflected in company sizes; in terms of number of employees. Corporations seem to prefer to accommodate most employees in one location. Large sized offices are in case of a single user often headquarters of corporations. There are also large buildings with several office units. This type of location which accommodates 60%-80% offices, supported by amenities is likely to exist in large cities.

Through a systematic approach, as applied in this study, and examination of data from other case studies these possible types can be tested on validity and/or probability.

Hybrid types

Another possibility is that an existing office site has characteristics that correspond with different types. This could be the case if more than the two decisive parameters are used for type construction. Cases that correspond with two types are regarded as hybrid types (Doty & Glick 1994)

A more in-depth analysis of office accommodation can be carried out to address all the possible office sites in Amsterdam. This research aimed at performing a first analysis of sites in order to explore the possibilities of constructing an office site typology.

5 PART
CONCLUSIONS

10. CONCLUSIONS & RECOMMENDATIONS

The notion 'office site' has not been thoroughly explored before. In practice and literature a general definition of office sites seems to be applicable for all real sites. Distinctions between office sites are only made on the basis of economical aspects such as rent levels and vacancy rates. This research concerns a first approach to type construction of office sites; using nine cases studies in Amsterdam analyzed by means of spatial parameters.

Typology studies

A main question supported by two sub-questions was leading in this study. This first sub-question is oriented at understanding what typologies are used for and how these can be defined and constructed.

What is the purpose of typologies and what are essential elements of these?

This question, which is a generic one, is answered from literature. Literature on typologies in (CRE) management and the built environment is studied.

A typology in this research is defined as the study or systematic classification of types that have characteristics or traits in common (TAHD 2009). Typologies in the field of (corporate real estate) management are frequently aimed at differentiating ideal organizational types. The main purpose of these typologies is to define types of ideal organizations through which higher effectiveness can be achieved. Organizations that approximate one of these ideal types are expected to be more effective than other organizations.

Spatial typologies are, different topology studies, regarding the built environment which have a descriptive nature. These studies concern bottom-up approaches which aim at classifying the built environment rather than defining ideal types. Spatial typologies are successful as communicator and often applied in policy making. The instructive aspect of current spatial typologies is that these are often very clear, readable and usable through the abstraction to a diagram in which the components of the studies come together.

Approach to developing typologies

From the examination of essential aspects of organisational and spatial typologies an approach to developing typologies is defined and applied in this research. This approach offered a clear structure for type construction of office sites. They way this is applied in this research is depicted in figure 10.6.

The next main steps are defined and illustrated in figure 10.1:

1 **PURPOSE**. The definition of the subject for type construction and its purpose should be clearly defined as to avoid confusion regarding the employment of it.

2 DEFINE ABSTRACT **PARAMETERS**. A necessity is the abstraction of relevant urban concepts to parameters, since descriptions that are too detailed leave little space for type constructions.

3 **CLASSIFICATION** SCHEME. As classification is the condition for combinations; it is therefore essential to develop a classification method for parameter aspects.

4 CONSISTENT **CONSTRUCTS.** It is important to identify the decisive parameters to enable creating constructs based on the same parameters. In order that types can be distinguished on the same set of spatial characteristics.

5 DEFINITION AND REPRESENTATION OF **TYPES** Clear descriptions and illustrations of the distinguished types enable recognition of types and support a clear language regarding the theme.

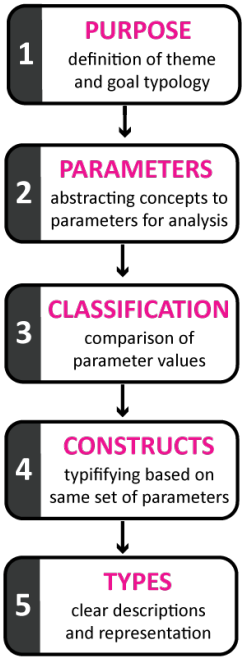


Figure 10.1 Approach to developing typologies

Spatial parameters

Distinguishing types of office sites will be done based on spatial characteristics of sites. It is therefore relevant to study which spatial parameters can be applied in the analysis of cases studies. Furthermore is it important to indentify decisive parameters to create combinations of the same set of parameters.

Which spatial parameters are relevant to distinguish office sites? Which (of these parameters) are decisive in the assignation of office site types?

From the study of different typologies that are based on spatial characteristics, the next parameters have been derived to be applied in the case analysis.

POSITION The position of a site towards city center, expressed in meters from Dam square in Amsterdam.

NODES The connectivity of an office location in terms of the availability of public transport (PT) nodes and stops. This is expressed in the amount of PT connections per hectare.

PERIMETER Presence of a perceivable perimeter around office area, illustrated in images.

DENSITY Density aspects by means of the Spacemate indices FSI, GSI, OSR and Layers.

GRAINS Grain size of office building in office sites, calculated in average Gross Floor Area of office buildings.

FUNCTIONS The function mix of an area, expressed in percentages of housing, amenities, business and offices.

USERS The number of companies in an area, expressed in number of companies with at least 50 employees (office related) per hectare.

All parameters have been operationalised by assigning a method to calculate or determine the spatial aspects regarding the parameter of an office site. This way different characteristics of office sites could be identified and sites were compared. This is done by assigning abstract values to the output of quantitative calculations of the parameters. By assigning bandwidths to the quantitative values three matrix per parameter (e.g. low, average, large) were distinguished.

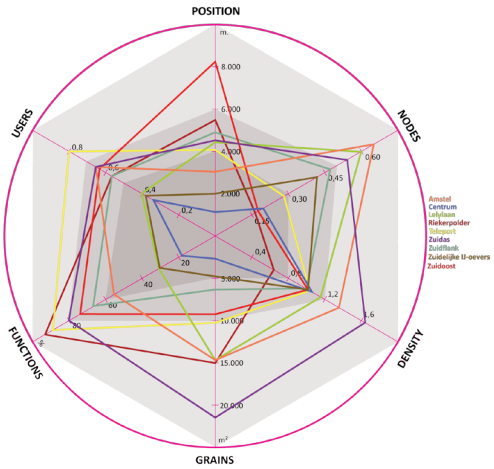
Approaches to classification

Next methods for classification of the parameter values were defined to enable combination of office site characteristics. Three approaches were used: mathematical approach, quantitative approach and visual approach of parameter values.

The mathematical approach uses a matrix as classification scheme of abstract parameter values. This offers a clear way of comparing abstract values of parameters. This method enables to use identify combinations between office sites based on the parameters. There is search for combinations with at least four corresponding parameter values. This method showed five combinations between the nine office sites, depicted in colours in the next figure.

	POSITION	NODES	PERIMETER	DENSITY	GRAINS	FUNCTIONS	USERS
Amstel		central	infrastructural	high		mixed area	average
Centrum	poor	central	no	average	small	mixed area	few
Lelylaan	good	ring	infrastructural	average	large	mixed area	few
Riekerpolder	poor	ring	perceivable	low	large	mainly offices	average
Teleport	poor	ring	infrastructural	average	large	mainly offices	many
Zuidas	good	ring	perceivable	high	large	supported offices	average
Zuidflank	average	ring	no	average	medium	supported offices	average
Zuidelijke IJ-oevers	average	central	infrastructural	average	small	mixed area	few
Zuidoost	poor	peripheral	no	average	medium	supported offices	average

Figure 10.2 Matrix of mathematical approach



The quantitative approach is based on the calculations of parameters with quantitative methods. Six parameters were assembled in a quantitative diagram; a radar chart. The different bandwidths per parameter are positioned within the chart as can be read from the image in shades of gray. Next, office sites are drawn in different colours; this allows for comparison. This method is useful when considering more cases.

Figure 10.3 Office sites depicted in a radar chart

The third approach is a visual approach of the spatial composition of parameters. Quantitative or mathematical values lack in describing 'how' a parameter appears. For instance, function mixing has different ways of distribution of functions which is not expressed by numbers or words. Therefore visual values of parameters are illustrated and combined (e.g. figure 10.4). This approach is helpful when continuing a more in-depth parameter analysis and aiming at describing types in detail.

Figure 10.4 Graphical values for the office site Zuidoost

Type construction

From the three approaches the mathematical approach is most suitable for comparison when working with a small number of case studies. Through type construction by means of the matrix, four parameters appeared to be dominant in combinations. These were DENSITY, GRAINS, FUNCTIONS and USERS. Of these GRAINS and FUNCTIONS appeared to be decisive in type construction.

This relates to the main question of this research:

CAN DIFFERENT TYPES OF OFFICE SITES BE DISTINGUISED BASED ON SPATIAL PARAMETERS?

The systematic approach did allow for type construction. By means of a classification scheme based on spatial parameters office sites were compared and types identified.

Within the dataset of nine office sites as case studies in Amsterdam the next four types are defined. Abstract illustrations of the types are shown in figure 10.5 on the next page.

TYPE 1 METROPOLITAN

Office site with a high density, large buildings and mixed functions and average amount of office users.

TYPE 2 CENTRAL URBAN

Office site with an average density, small buildings, mixed functions and few office users.

TYPE 3 SUPPORTED OFFICES

Office site with an average density, medium sized buildings, a fair amount of offices supported by amenities and an average number of office users.

TYPE 4 MONOFUNCTIONAL

Office site with large buildings and mainly offices.

10.5 Abstract representation of the office site types.

Conclusions

To conclude, this study revealed four types of office sites. However concluding on generic types of office sites is not possible based on a dataset of nine case studies. To do so, the dataset should be enlarged, e.g. with office sites in other cities in the Netherlands. Overall it can be said that a classification of office sites based on spatial parameters does allow for office site type construction.

This systematic approach of typology development could also be applied to other types of sites than office sites. The basic principle of the approach is to define what kind of typology is aimed at. Searching for relevant parameters and expressing these in quantitative methods to enable the abstraction of complex concepts. Defining a classification method is a key element in typology development. This can be done in various ways as long as there is a logic systematic approach and a clear way of depiction to it. In the next figure is summarized how the systematic approach has been applied in this research.

Recommendations

In this study a certain definition has been described for what office sites are considered to be in order to be able to select locations in Amsterdam for analysis. Creating definitions always leads to including and excluding aspects for research. This study focused on the main office sites in Amsterdam to enable a first exploration into type construction. In future studies on this topic the definition of the subject could be approached from different scale levels. This way the studied office sites (and other sites) could be analyzed in parts, e.g. neighborhood, street and block level and possibly reveal types within types. Even the single office accommodation could be considered. It could also be relevant to include business space as part of the subject.

Including nine different office sites in the study did not allow for an even deeper investigation into the main research question. What it did achieve, however, is that it was possible to get insight in typology development and its components. This allowed for a first exploration to distinguishing office site types.

At the same time, these findings cannot yet be generalised. In order to do so, it would be important to add more cases. This would lead to validation as well as further refinement of the found types. Therefore, this research must not be seen as a final product, but rather a first attempt to clarifying the concept of office sites. The study might be extended and deepened; this could lead to the identification of more types.

Another interesting aspects to consider is to add other parameters besides spatial oriented, such as economical parameters as rent levels and vacancy rates of areas to the analysis to also typify the locations based on these aspects. Through this an immediate practical use of the classification could be imparted. This could be significant to local governments, developers and investors.

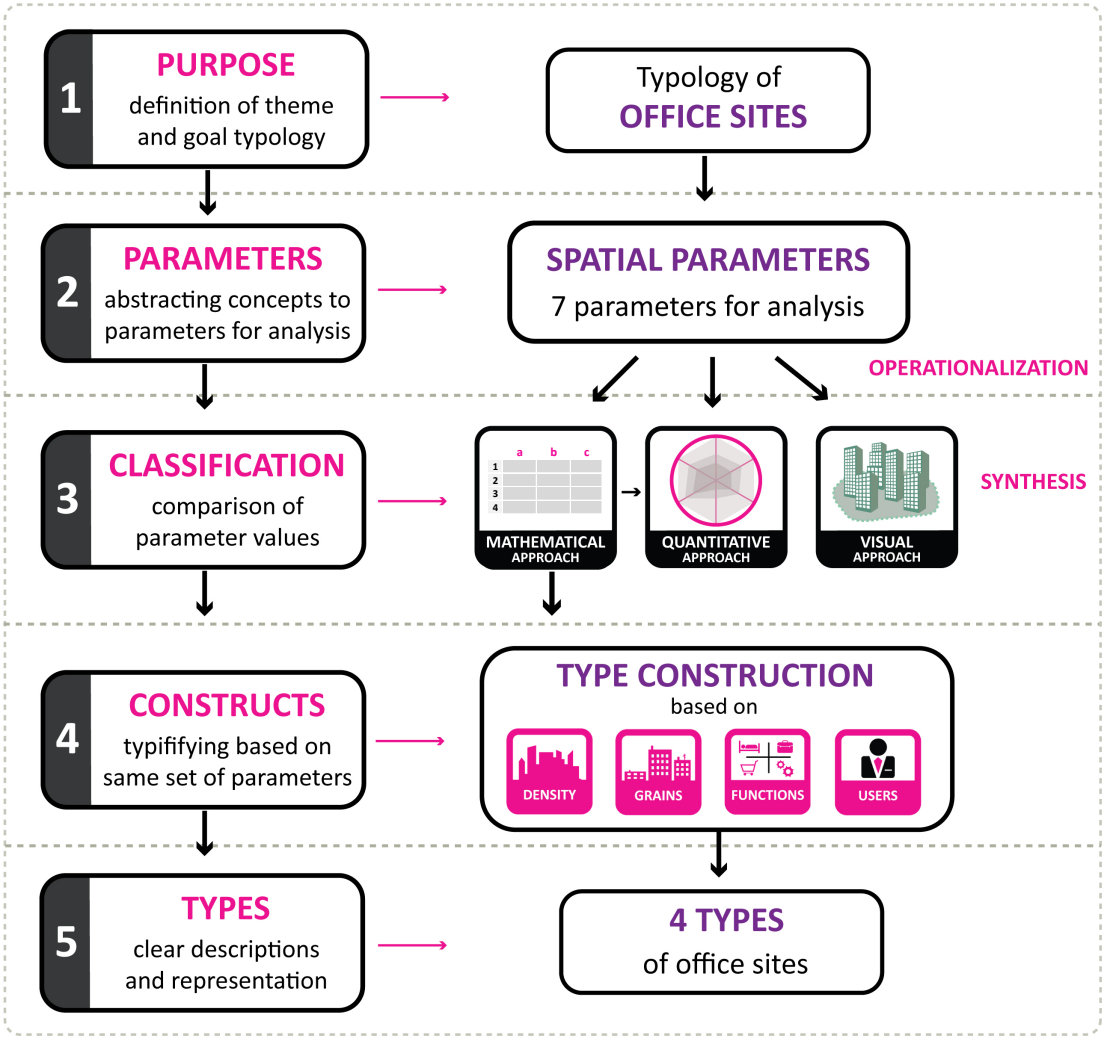


Figure 10.6 Use of systematic approach for office site typology

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